ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaatccaactctgaagaagcaaagaaagaggaggccaaaaaggaggaagccaaga
aatctaacagcgtcgacattgttctgactcagtctccagccaccctgtctgtgactccaggagatagagtctctctttcctgcagggcc
agccagagtattagcgactacttacactggtatcaacaaaaatcacatgagtctccaaggcttctcatcaaatatgcttcccattccatc
tctgggatcccctccaggttcagtggcagtggatcagggtcagatttcactctcagtatcaacagtgtggaacctgaagatgttggaa
tttattactgtcaacatggtcacagctttccgtggacgttcggtggaggcaccaagctggaaatcaaacggggtggcggtggctcg
ggcggaggtgggtcgggtggcggcggatctcagatccagttggtgcaatctggacctgagctgaagaagcctggagagacagt
caggatctcctgcaaggcttctgggtatgccttcacaactactggaatgcagtgggtgcaagagatgccaggaaagggtttgaagt
ggattggctggataaacaccccactctggagtgccaaaatatgtagaagacttcaaggacggtttgccttctctttggaaacctctgc
caacactgcatatttacagataagcaacctcaaagatgaggacacggctacgtatttctgtgtgagatccgggaatggtaactatga
cctggcctactttgcttactggggccaagggacactggtcactgtctctgatcaggagcccaaatcttctgacaaaactcacacatcc
ccaccgtccccagcacctgaactcctgggggggatcgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccg
gacccctgaggtcacatgcgtggtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtgga
ggtgcataatgccaagacaaagccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcacca
ggactggctgaatggcaaggagtacaagtgcaaggtctccaacaaagccctcccagccccatcgagaaaacaatctccaaagc
caaagggcagccccgagaaccacaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacct
gcctggtcaaaggcttctatcccagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacg
cctcccgtgctggactccgacggctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtct
tctcatgctccgtgatgcatgaggctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

**2H7-antiCD40 scFv MTH (SSS) MTCH2WTCH3 (2H7-40.2.220Ig) (amino acid sequence) (SEQ ID NO:___)**

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKGGGGSGGGGSGGGGSSQAYLQQSGAELVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQSNSEEAK
KEEAKKEEAKKSNSVDIVLTQSPATLSVTPGDRVSLSCRASQSISDYLHWYQQKSH
ESPRLLIKYASHSISGIPSRFSGSGSGSDFTLSINSVEPEDVGIYYCQHGHSFPWTFGG
GTKLEIKRGGGGSGGGGSGGGGSQIQLVQSGPELKKPGETVRISCKASGYAFTTTG
MQWVQEMPGKGLKWIGWINTPLWSAKICRRLQGRFAFSLETSANTAYLQISNLKD

EDTATYFCVRSGNGNYDLAYFAYWGQGTLVTVSDQEPKSSDKTHTSPPSPAPELL
GGSSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHNAKTK
PREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKGQPRE
PQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVLDSD
GSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

**5B9 VH (includes the VH leader peptide) (nucleotide sequence) (SEQ ID NO:___)**

atggctgtcttggggctgctcttctgcctggtgacatttccaagctgtgtcctatcccaggtgcagctgaagcagtcaggacctggcc
tagtgcagtcctcacagagcctgtccatcacctgcacagtctctggtttctcattaactacctatgctgtacactgggttcgccagtctc
caggaaagggtctggagtggctgggagtgatatggagtggtggaatcacagactataatgcagctttcatatccagactgagcatc
accaaggacgattccaagagccaagttttctttaaaatgaacagtctgcaacctaatgacacagccatttattactgtgccagaaatg
ggggtgataactacccttattactatgctatggactactggggtcaaggaacctcagtcaccgtctcctca

**5B9 VH (minus the leader) (nucleotide sequence) (SEQ ID NO:___)**

caggtgcagctgaagcagtcaggacctggcctagtgcagtcctcacagagcctgtccatcacctgcacagtctctggtttctcatta
actacctatgctgtacactgggttcgccagtctccaggaaagggtctggagtggctgggagtgatatggagtggtggaatcacaga
ctataatgcagctttcatatccagactgagcatcaccaaggacgattccaagagccaagttttctttaaaatgaacagtctgcaaccta
atgacacagccatttattactgtgccagaaatgggggtgataactacccttattactatgctatggactactggggtcaaggaacctca
gtcaccgtctcctca

**5B9 VH (includes leader peptide) (amino acid sequence) (SEQ ID NO:___)**

MAVLGLLFCLVTFPSCVLSQVQLKQSGPGLVQSSQSLSITCTVSGFSLTTYAVHWV
RQSPGKGLEWLGVIWSGGITDYNAAFISRLSITKDDSKSQVFFKMNSLQPNDTAIY
YCARNGGDNYPYYYAMDYWGQGTSVTVSS

**5B9 VH (no leader peptide) (amino acid sequence) (SEQ ID NO:___)**

QVQLKQSGPGLVQSSQSLSITCTVSGFSLTTYAVHWVRQSPGKGLEWLGVIWSGGI
TDYNAAFISRLSITKDDSKSQVFFKMNSLQPNDTAIYYCARNGGDNYPYYYAMDY
WGQGTSVTVSS

**5B9 VL (nucleotide sequence) (SEQ ID NO:___)**

atgaggttctctgctcagcttctggggctgcttgtgctctggatccctggatccactgcagatattgtgatgacgcaggctgcattctc
caatccagtcactcttggaacatcagcttccatctcctgcaggtctagtaagagtctcctacatagtaatggcatcacttatttgtattgg
tatctgcagaagccaggccagtctcctcagctcctgatttatcagatgtccaaccttgcctcaggagtcccagacaggttcagtagca
gtgggtcaggaactgatttcacactgagaatcagcagagtggaggctgaggatgtgggtgtttattactgtgctcaaaatctagaact
tccgctcacgttcggtgctgggaccaagctggagctgaaacgg

**5B9 VL (amino acid sequence) (SEQ ID NO:___)**

MRFSAQLLGLLVLWIPGSTADIVMTQAAFSNPVTLGTSASISCRSSKSLLHSNGITY
LYWYLQKPGQSPQLLIYQMSNLASGVPDRFSSSGSGTDFTLRISRVEAEDVGVYYC
AQNLELPLTFGAGTKLELKR

**5B9 scFv (nucleotide sequence) (SEQ ID NO:___)**

aagcttgccgccatgaggttctctgctcagcttctggggctgcttgtgctctggatccctggatccactgcagatattgtgatgacgca
ggctgcattctccaatccagtcactcttggaacatcagcttccatctcctgcaggtctagtaagagtctcctacatagtaatggcatca
cttatttgtattggtatctgcagaagccaggccagtctcctcagctcctgatttatcagatgtccaaccttgcctcaggagtcccagaca
ggttcagtagcagtgggtcaggaactgatttcacactgagaatcagcagagtggaggctgaggatgtgggtgtttattactgtgctc
aaaatctagaacttccgctcacgttcggtgctgggaccaagctggagctgaaacggggtggcggtggctcgggcggtggtgggt
cgggtggcggcggatcgtcacaggtgcagctgaagcagtcaggacctggcctagtgcagtcctcacagagcctgtccatcacct
gcacagtctctggtttctcattaactacctatgctgtacactgggttcgccagtctccaggaaagggtctggagtggctgggagtgat
atggagtggtggaatcacagactataatgcagctttcatatccagactgagcatcaccaaggacgattccaagagccaagttttcttt
aaaatgaacagtctgcaacctaatgacacagccatttattactgtgccagaaatgggggtgataactacccttattactatgctatgga
ctactggggtcaaggaacctcagtcaccgtctcctct

**5B9 scFv (amino acid sequence)** (SEQ ID NO:___)

MRFSAQLLGLLVLWIPGSTADIVMTQAAFSNPVTLGTSASISCRSSKSLLHSNGITY
LYWYLQKPGQSPQLLIYQMSNLASGVPDRFSSSGSGTDFTLRISRVEAEDVGVYYC
AQNLELPLTFGAGTKLELKRGGGGSGGGGSGGGGSSQVQLKQSGPGLVQSSQSLS
ITCTVSGFSLTTYAVHWVRQSPGKGLEWLGVIWSGGITDYNAAFISRLSITKDDSK
SQVFFKMNSLQPNDTAIYYCARNGGDNYPYYYAMDYWGQGTSVTVSS

**5B9 scFv-hmtIgG1-hCD80 (nucleotide sequence)** (SEQ ID NO:___)

aagcttgccgccatgaggttctctgctcagcttctggggctgcttgtgctctggatccctggatccactgcagatattgtgatgacgca
ggctgcattctccaatccagtcactcttggaacatcagcttccatctcctgcaggtctagtaagagtctcctacatagtaatggcatca
cttatttgtattggtatctgcagaagccaggccagtctcctcagctcctgatttatcagatgtccaaccttgcctcaggagtcccagaca
ggttcagtagcagtgggtcaggaactgatttcacactgagaatcagcagagtggaggctgaggatgtgggtgtttattactgtgctc
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cgggtggcggcggatcgtcacaggtgcagctgaagcagtcaggacctggcctagtgcagtcctcacagagcctgtccatcacct
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aaaatgaacagtctgcaacctaatgacacagccatttattactgtgccagaaatgggggtgataactacccttattactatgctatgga
ctactggggtcaaggaacctcagtcaccgtctcctctgatctggagcccaaatcttctgacaaaactcacacaagcccaccgagcc
cagcacctgaactcctgggggggatcgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggacccctgag
gtcacatgcgtggtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataat
gccaagacaaagccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggct
gaatggcaaggagtacaagtgcaaggtctccaacaaagccctcccagcccccatcgagaaaaccatctccaaagccaaagggc
agccccgagaaccacaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtca
aaggcttctatcccagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtg
ctggactccgacggctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctc
cgtgatgcatgaggctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaagcggatccttcgaacctgctcc
atcctgggccattaccttaatctcagtaaatggaatttttgtgatatgctgcctgacctactgctttgccccaagatgcagagagaga
aggaggaatgagagattgagaagggaaagtgtacgccctgtataaatcgatactcgag

**5B9 scFv-hmtIgG1-hCD80 (amino acid sequence)** (SEQ ID NO:___)

MRFSAQLLGLLVLWIPGSTADIVMTQAAFSNPVTLGTSASISCRSSKSLLHSNGITY
LYWYLQKPGQSPQLLIYQMSNLASGVPDRFSSSGSGTDFTLRISRVEAEDVGVYYC
AQNLELPLTFGAGTKLELKRGGGGSGGGGSGGGGSSQVQLKQSGPGLVQSSQSLS
ITCTVSGFSLTTYAVHWVRQSPGKGLEWLGVIWSGGITDYNAAFISRLSITKDDSK
SQVFFKMNSLQPNDTAIYYCARNGGDNYPYYYAMDYWGQGTSVTVSSDLEPKSS
DKTHTSPPSPAPELLGGSSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNW
YVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPA
PIEKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQP

ENNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLS
LSPGKADPSNLLPSWAITLISVNGIFVICCLTYCFAPRCRERRRNERLRRESVRPV

**2e12 scFv WTH CH2 CH3 (2e12 scFv-WthIgG-CD80) (nucleotide sequence) (SEQ ID NO:___)**

aagcttatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataatgtccagaggagtcgacattgtgctcaccc
aatctccagcttctttggctgtgtctctaggtcagagagccaccatctcctgcagagccagtgaaagtgttgaatattatgtcacaagtt
taatgcagtggtaccaacagaaaccaggacagccacccaaactcctcatctctgctgcatccaacgtagaatctggggtccctgcc
aggtttagtggcagtgggtctgggacagacttcagcctcaacatccatcctgtggaggaggatgatattgcaatgtatttctgtcagc
aaagtaggaaggttccttggacgttcggtggaggcaccaagctggaaatcaaacggggtggcggtggctcgggcggaggtggg
tcgggtggcggcggatctcaggtgcagctgaaggagtcaggacctggcctggtggcgccctcacagagcctgtccatcacatgc
accgtctcagggttctcattaaccggctatggtgtaaactgggttcgccagcctccaggaaagggtctggagtggctgggaatgat
atggggtgatggaagcacagactataattcagctctcaaatccagactgagcatcaccaaggacaactccaagagccaagttttctt
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gcacctgaactcctgggggggaccgtcagtcttcctcttccccccaaaacccaaggacaccctcatgatctcccggacccctgaggt
cacatgcgtggtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgc
caagacaaagccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctga
atggcaaggagtacaagtgcaaggtctccaacaaagccctcccagcccccatcgagaaaaccatctccaaagccaaagggcag
ccccgagaaccacaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaa
ggcttctatcccagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgct
ggactccgacggctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctcc
gtgatgcatgaggctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaagcggatccttcgaacctgctccc
atcctgggccattaccttaatctcagtaaatggaatttttgtgatatgctgcctgacctactgctttgccccaagatgcagagagagaa
ggaggaatgagagattgagaagggaaagtgtacgccctgtataaatcgat

**2e12 scFv WTH CH2 CH3 (2e12 scFv-WthIgG-CD80) (amino acid sequence) (SEQ ID NO:___)**

MDFQVQIFSFLLISASVIMSRGVDIVLTQSPASLAVSLGQRATISCRASESVEYYVTS
LMQWYQQKPGQPPKLLISAASNVESGVPARFSGSGSGTDFSLNIHPVEEDDIAMYF
CQQSRKVPWTFGGGTKLEIKRGGGGSGGGGSGGGGSQVQLKESGPGLVAPSQSLS
ITCTVSGFSLTGYGVNWVRQPPGKGLEWLGMIWGDGSTDYNSALKSRLSITKDNS

KSQVFLKMNSLQTDDTARYYCARDGYSNFHYYVMDYWGQGTSVTVSSDLEPKS
CDKTHTCPPCPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFN
WYVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALP
APIEKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQ
PENNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSL
SLSPGKADPSNLLPSWAITLISVNGIFVICCLTYCFAPRCRERRRNERLRRESVRPV

**2H7-human IgE Fc (CH2-CH3-CH4) (nucleotide sequence) (SEQ ID NO:___)**

aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctcccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaaggtggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagctggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
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ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctctgatcacgtctgctccagggacttcaccccgcccaccgtgaagatcttacagtcgtcctgcgacg
gcggcgggcacttcccccgaccatccagctcctgtgcctcgtctctgggtacaccccagggactatcaacatcacctggctgga
ggacgggcaggtcatggacgtggacttgtccaccgcctctaccacgcaggagggtgagctggcctccacacaaagcgagctca
ccctcagccagaagcactggctgtcagaccgcacctacacctgccaggtcacctatcaaggtcacacctttgaggacagcaccaa
gaagtgtgcagattccaacccgagaggggtgagcgcctacctaagccggcccagcccgttcgacctgttcatccgcaagtcgcc
cacgatcacctgtctggtggtggacctggcacccagcaaggggaccgtgaacctgacctggtcccgggccagtgggaagcctgt
gaaccactccaccagaaaggaggagaagcagcgcaatggcacgttaaccgtcacgtccaccctgccggtgggcacccgagact
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acgcagccccgcaagaccaagggctccggcttcttcgtcttcagccgcctggaggtgaccagggccgaatgggagcagaaaga
tgagttcatctgccgtgcagtccatgaggcagcgagcccctcacagaccgtccagcgagcggtgtctgtaaatcccggtaaatgat
aatctaga

**2H7 scFv IgE (CH2-CH3-CH4) (amino acid sequence) (SEQ ID NO:___)**

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKGGGGSGGGGSGGGGSSQAYLQQSGAELVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSDHVCSRDFTP
PTVKILQSSCDGGGHFPPTIQLLCLVSGYTPGTINITWLEDGQVMDVDLSTASTTQE
GELASTQSELTLSQKHWLSDRTYTCQVTYQGHTFEDSTKKCADSNPRGVSAYLSR
PSPFDLFIRKSPTITCLVVDLAPSKGTVNLTWSRASGKPVNHSTRKEEKQRNGTLTV
TSTLPVGTRDWIEGETYQCRVTHPHLPRALMRSTTKTSGPRAAPEVYAFATPEWP
GSRDKRTLACLIQNFMPEDISVQWLHNEVQLPDARHSTTQPRKTKGSGFFVFSRLE
VTRAEWEQKDEFICRAVHEAASPSQTVQRAVSVNPGK

**2H7 scFv MH (SSS) MCH2WTCH3 (nucleotide sequence) (SEQ ID NO:___)**

aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
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tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttctgacaaaactcacacatccccaccgtccccagcacctgaac
tcctgggggggatcgtcagtcttcctcttccccccaaaacccaaggacaccctcatgatctcccggaccctgaggtcacatgcgtg
gtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaag
ccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaagga
gtacaagtgcaaggtctccaacaaagccctcccagccccatcgagaaaacaatctccaaagccaaagggcagccccgagaac
cacaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatcc
cagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgac
ggctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatga
ggctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

**2H7 scFv MH (SSS) MCH2WTCH3 (amino acid sequence) (SEQ ID NO:___)**

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAELVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSSDK
THTSPPSPAPELLGGSSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLS
PGK

**5B9 scFv MTHWTCH2CH3 (nucleotide sequence) (SEQ ID NO:___)**

aagcttgccgccatgaggttctctgctcagcttctggggctgcttgtgctctggatccctggatccactgcagatattgtgatgacgca
ggctgcattctccaatccagtcactcttggaacatcagcttccatctcctgcaggtctagtaagagtctcctacatagtaatggcatca
cttatttgtattggtatctgcagaagccaggccagtctcctcagctcctgatttatcagatgtccaaccttgcctcaggagtcccagaca
ggttcagtagcagtgggtcaggaactgatttcacactgagaatcagcagagtggaggctgaggatgtgggtgtttattactgtgctc
aaaatctagaacttccgctcacgttcggtgctgggaccaagctggagctgaaacggggtggcggtggctcgggcggtggtgggt
cgggtggcggcggatcgtcacaggtgcagctgaagcagtcaggacctggcctagtgcagtcctcacagagcctgtccatcacct
gcacagtctctggtttctcattaactacctatgctgtacactgggttcgccagtctccaggaaagggtctggagtggctgggagtgat
atggagtggtggaatcacagactataatgcagctttcatatccagactgagcatcaccaaggacgattccaagagccaagttttcttt
aaaatgaacagtctgcaacctaatgacacagccatttattactgtgccagaaatgggggtgataactacccttattactatgctatgga
ctactggggtcaaggaacctcagtcaccgtctcctctgatcaggagcccaaatcttctgacaaaactcacacatccccaccgtcccc
agcacctgaactcctgggggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggacccctgag
gtcacatgcgtggtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataat
gccaagacaaagccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggct
gaatggcaaggagtacaagtgcaaggtctccaacaaagccctcccagccccatcgagaaaacaatctccaaagccaaagggc
agccccgagaaccacaggtgtacaccctgccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtca
aaggcttctatcccagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtg
ctggactccgacggctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctc
cgtgatgcatgaggctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

**5B9 scFv MTHWTCH2CH3 (amino acid sequence)** (SEQ ID NO:___)

MRFSAQLLGLLVLWIPGSTADIVMTQAAFSNPVTLGTSASISCRSSKSLLHSNGITY
LYWYLQKPGQSPQLLIYQMSNLASGVPDRFSSSGSGTDFTLRISRVEAEDVGVYYC
AQNLELPLTFGAGTKLELKRGGGGSGGGGSGGGGSSQVQLKQSGPGLVQSSQSLS
ITCTVSGFSLTTYAVHWVRQSPGKGLEWLGVIWSGGITDYNAAFISRLSITKDDSK
SQVFFKMNSLQPNDTAIYYCARNGGDNYPYYYAMDYWGQGTSVTVSSDQEPKSS
DKTHTSPPSPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNW
YVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPA
PIEKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQP
ENNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLS
LSPGK

**Human IgG1 hinge mutations**

**2H7 scFv- MTH (CSS) WTCH2CH3 (nucleotide sequence)** (SEQ ID NO:___)

aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagctggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttgtgacaaaactcacacatccccaccgtccccagcacctgaac
tcctgggggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggacccctgaggtcacatgcgtg
gtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaag
ccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaagga
gtacaagtgcaaggtctccaacaaagccctcccagccccatcgagaaaacaatctccaaagccaaagggcagccccgagaac
cacaggtgtacaccctgccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatcc
cagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgac

ggctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatga
ggctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

**2H7 scFv- MTH (CSS) WTCH2CH3 (amino acid sequence) (SEQ ID NO:___)**

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAELVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSCDK
THTSPPSPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLS
PGK

**2H7 scFv- MTH (SCS) WTCH2CH3 (nucleotide sequence) (SEQ ID NO:___)**

aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctcccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagctggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
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ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttctgacaaaactcacacatgcccaccgtccccagcacctgaac
tcctgggggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggaccctgaggtcacatgcgtg
gtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaag
ccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaagga
gtacaagtgcaaggtctccaacaaagccctcccagccccatcgagaaaacaatctccaaagccaaagggcagccccgagaac
cacaggtgtacaccctgccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatcc

cagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgac
ggctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatga
ggctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

**2H7 scFv- MTH (SCS) WTCH2CH3 (amino acid sequence) (SEQ ID NO:___)**

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAELVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSSDK
THTCPPSPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWY
VDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
NNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSL
SPGK

**2H7 scFv- MTH (SSC) WTCH2CH3 (nucleotide sequence) (SEQ ID NO:___)**

aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctcccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagctggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttctgacaaaactcacacatccccaccgtgcccagcacctgaac
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ccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaagga
gtacaagtgcaaggtctccaacaaagccctcccagccccatcgagaaaacaatctccaaagccaaagggcagccccgagaac

cacaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatcc
cagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgac
ggctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatga
ggctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

**2H7 scFv- MTH (SSC) WTCH2CH3 (amino acid sequence) (SEQ ID NO:___)**

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAELVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSSDK
THTSPPCPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWY
VDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
NNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSL
SPGK

**HIgGMHcys1 (nucleotide sequence) (SEQ ID NO:___)**

gtt gtt gat cag gag ccc aaa tct tct gac aaa act cac aca tg

**HIgGMHcys2 (nucleotide sequence) (SEQ ID NO:___)**

gtt gtt gat cag gag ccc aaa tct tgt gac aaa act cac aca tct cca ccg tgc

**HIgGMHcys3 (nucleotide sequence) (SEQ ID NO:___)**

gtt gtt gat cag gag ccc aaa tct tgt gac aaa act cac aca tgt cca ccg tcc cca gca cct

**HuIgG1 MTCH3Y405 (nucleotide sequence) (SEQ ID NO:___)**

gggcagccccgagaaccacaggtgtacaccctgcccccatcccgggaggagatgaccaagaaccaggtcagcctgacctgcct
ggtcaaaggcttctatcccagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctc

ccgtgctggactccgacggctccttctacctctatagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctc
atgctccgtgatgcatgaggctctgcacaaccactacacgcagaagagcctctccctgtccccgggtaaatga

**HuIgG1_MTCH3Y405 (amino acid sequence) (SEQ ID NO:___)**

GQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPP
VLDSDGSFYLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

**HuIgG1 MTCH3A405 (nucleotide sequence) (SEQ ID NO:___)**

gggcagccccgagaaccacaggtgtacaccctgcccccatcccgggaggagatgaccaagaaccaggtcagcctgacctgcct
ggtcaaaggcttctatcccagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctc
ccgtgctggactccgacggctccttcgccctctatagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctc
atgctccgtgatgcatgaggctctgcacaaccactacacgcagaagagcctctccctgtccccgggtaaatga

**HuIgG1 MTCH3A405 (amino acid sequence) (SEQ ID NO:___)**

GQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPP
VLDSDGSFALYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

**HuIgG1 MTCH3A407 (nucleotide sequence) (SEQ ID NO:___)**

Gggcagccccgagaaccacaggtgtacaccctgcccccatcccgggaggagatgaccaagaaccaggtcagcctgacctgcc
tggtcaaaggcttctatcccagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcct
cccgtgctggactccgacggctccttcttcctcgccagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttct
catgctccgtgatgcatgaggctctgcacaaccactacacgcagaagagcctctccctgtccccgggtaaatga

**HuIgG1 MTCH3A407 (amino acid sequence) (SEQ ID NO:___)**

GQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPP
VLDSDGSFFLASKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

**HuIgG1 MTCH3Y405A407 (nucleotide sequence) (SEQ ID NO:___)**

gggcagccccgagaaccacaggtgtacaccctgcccccatcccgggaggagatgaccaagaaccaggtcagcctgacctgcct
ggtcaaaggcttctatcccagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctc
ccgtgctggactccgacggctccttctacctcgccagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctc
atgctccgtgatgcatgaggctctgcacaaccactacacgcagaagagcctctccctgtccccgggtaaatga

**HuIgG1 MTCH3Y405A407 (amino acid sequence) (SEQ ID NO:___)**

GQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPP
VLDSDGSFYLASKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

**HuIgG1 MTCH3A405A407 (nucleotide sequence) (SEQ ID NO:___)**

gggcagccccgagaaccacaggtgtacaccctgcccccatcccgggaggagatgaccaagaaccaggtcagcctgacctgcct
ggtcaaaggcttctatcccagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctc
ccgtgctggactccgacggctccttcgccctcgccagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttct
catgctccgtgatgcatgaggctctgcacaaccactacacgcagaagagcctctccctgtccccgggtaaatga

**HuIgG1 MTCH3A405A407 (amino acid sequence) (SEQ ID NO:___)**

GQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPP
VLDSDGSFALASKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

**2H7 scFv MTH (SSS) WTCH2MTCH3Y405 (nucleotide sequence) (SEQ ID NO:___)**

aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctcccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
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cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttctgacaaaactcacacatcccccaccgtccccagcacctgaac

tcctgggggacgtcagtcttcctcttccccccaaaacccaaggacaccctcatgatctcccggaccctgaggtcacatgcgtg
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ccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaagga
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cacaggtgtacaccctgcccccatcccgggaggagatgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatcc
cagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgac
ggctccttctacctctatagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatga
ggctctgcacaaccactacacgcagaagagcctctccctgtccccgggtaaatgatctaga

**2H7 scFv MTH (SSS) WTCH2MTCH3Y405 (amino acid sequence) (SEQ ID NO:___)**

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAELVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSSDK
THTSPPSPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKAKGQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTPPVLDSDGSFYLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLS
PGK

**2H7 scFv MTH (SSS) WTCH2MTCH3A405 (nucleotide sequence) (SEQ ID NO:___)**

aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagctggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
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**<u>2H7 scFv MTH (SSS) WTCH2MTCH3A405</u> (nucleotide sequence) (SEQ ID NO:___)**

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**<u>2H7 scFv MTH (SSS) WTCH2MTCH3A407</u> (nucleotide sequence) (SEQ ID NO:___)**

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**2H7 scFv MTH (SSS) WTCH2MTCH3A407 (amino acid sequence) (SEQ ID NO:___)**

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
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THTSPPSPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
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PGK

**2H7 scFv MTH (SSS) WTCH2MTCH3Y405A407 (nucleotide sequence) (SEQ ID NO:___)**

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**2H7 scFv MTH (SSS) WTCH2MTCH3Y405A407 (amino acid sequence) (SEQ ID NO:___)**

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FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAELVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
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THTSPPSPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKAKGQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
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PGK

**2H7 scFv MTH (SSS) WTCH2MTCH3A405A407 (nucleotide sequence) (SEQ ID NO:___)**

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**2H7 scFv MTH (SSS) WTCH2MTCH3A405A407 (amino acid sequence) (SEQ ID NO:___)**

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FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAELVRPGASVKMSCK
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THTSPPSPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKAKGQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
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PGK

**2H7 scFv MTH (SCC) WTCH2CH3 (nucleotide sequence)**

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**2H7 scFv MTH (SCC) WTCH2CH3 (amino acid sequence)**

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
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TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSSDK
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EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
NNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSL
SPGK

**2H7 scFv MTH (CSC) WTCH2CH3 (nucleotide sequence)**

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**2H7 scFv MTH (CSC) WTCH2CH3 (amino acid sequence)**

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
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FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAELVRPGASVKMSCK
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TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSCDK
THTSPPCPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWY
VDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
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SPGK

**2H7 scFv MTH (CCS) WTCH2CH3 (nucleotide sequence)**

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**2H7 scFv MTH (CCS) WTCH2CH3 (amino acid sequence)**

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THTCPPSPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWY
VDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
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SPGK

**HuIgAHIgA-T4-ORF (nucleotide sequence)**

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ctgcgcgtggcagccgaggactggaagaaggggggacaccttctcctgcatggtgggccacgaggccctgccgctggccttcac
acagaagaccatcgaccgcttggcgggtaaacccacccatgtcaatgtgtctgttgtcatggcggaggtggacgcggatccttcga
ac

**HuIgAHIgA-T4-ORF (amino acid sequence)**

DQPVPSTPPTPSPSTPPTPSPSCCHPRLSLHRPALEDLLLGSEAILTCTLTGLRDASGV
TFTWTPSSGKSAVQGPPDRDLCGCYSVSSVLPGCAEPWNHGKTFTCTAAYPESKT
PLTATLSKSGNTFRPEVHLLPPPSEELALNELVTLTCLARGFSPKDVLVRWLQGSQ
ELPREKYLTWASRQEPSQGTTTFAVTSILRVAAEDWKKGDTFSCMVGHEALPLAF
TQKTIDRLAGKPTHVNVSVVMAEVDADPSN

**1D8-IgAH IgA-T4-CD80 (nucleotide sequence)**

aagcttatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataatgtccagaggagtcgacattgtgctcactc
agtctccaacaaccatagctgcatctccaggggagaaggtcaccatcacctgccgtgccagctccagtgtaagttacatgtactggt
accagcagaagtcaggcgcctcccctaaactctggatttatgacacatccaagctggcttctggagttccaaatcgcttcagtggca
gtgggtctgggacctcttattctctcgcaatcaacaccatggagactgaagatgctgccacttattactgtcagcagtggagtagtact
ccgctcacgttcgggtctgggaccaagctggagatcaaacggggtggcggtggctcgggcggtggtgggtcgggtggcggcg
gatctcaggtgcagctgaaggaggcaggacctggcctggtgcaaccgacacagaccctgtccctcacatgcactgtctctgggtt
ctcattaaccagcgatggtgtacactggattcgacagcctccaggaaagggtctggaatggatgggaataatatattatgatggagg
cacagattataattcagcaattaaatccagactgagcatcagcagggacacctccaagagccaagttttcttaaaaatcaacagtctg
caaactgatgacacagccatgtattactgtgccagaatccactttgattactggggccaaggagtcatggtcacagtctcctctgatc
agccagttccctcaactccacctaccccatctccctcaactccacctaccccatctccctcatgctgccacccccgactgtcactgca
ccgaccggccctcgaggacctgctcttaggttcagaagcgatcctcacgtgcacactgaccggcctgagagatgcctcaggtgtc
accttcacctggacgccctcaagtgggaagagcgctgttcaaggaccacctgaccgtgacctctgtggctgctacagcgtgtcca

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aaccgccaccctctcaaaatccggaaacacattccggcccgaggtccacctgctgccgccgccgtcggaggagctggccctgaa
cgagctggtgacgctgacgtgcctggcacgtggcttcagccccaaggatgtgctggttcgctggctgcaggggtcacaggagct
gccccgcgagaagtacctgacttgggcatcccggcaggagcccagccagggcaccaccaccttcgctgtgaccagcatactgc
gcgtggcagccgaggactggaagaaggggacaccttctcctgcatggtgggccacgaggccctgccgctggccttcacacag
aagaccatcgaccgcttggcgggtaaacccacccatgtcaatgtgtctgttgtcatggcggaggtggacgcggatccttcgaacaa
cctgctcccatcctgggccattaccttaatctcagtaaatggaatttttgtgatatgctgcctgacctactgctttgccccaagatgcag
agagagaaggaggaatgagagattgagaagggaaagtgtacgccctgtataaatcgatac

AA

**<u>1D8 scFv IgAH IgA-T4-CD80</u> (amino acid sequence)**

MDFQVQIFSFLLISASVIMSRGVDIVLTQSPTTIAASPGEKVTITCRASSSVSYMYWY
QQKSGASPKLWIYDTSKLASGVPNRFSGSGSGTSYSLAINTMETEDAATYYCQQW
SSTPLTFGSGTKLEIKRGGGGSGGGGSGGGGSQVQLKEAGPGLVQPTQTLSLTCTV
SGFSLTSDGVHWIRQPPGKGLEWMGIIYYDGGTDYNSAIKSRLSISRDTSKSQVFLK
INSLQTDDTAMYYCARIHFDYWGQGVMVTVSSDQPVPSTPPTPSPSTPPTPSPSCC
HPRLSLHRPALEDLLLGSEAILTCTLTGLRDASGVTFTWTPSSGKSAVQGPPDRDL
CGCYSVSSVLPGCAEPWNHGKTFTCTAAYPESKTPLTATLSKSGNTFRPEVHLLPP
PSEELALNELVTLTCLARGFSPKDVLVRWLQGSQELPREKYLTWASRQEPSQGTTT
FAVTSILRVAAEDWKKGDTFSCMVGHEALPLAFTQKTIDRLAGKPTHVNVSVVM
AEVDADPSNNLLPSWAITLISVNGIFVICCLTYCFAPRCRERRRNERLRRESVRPV

**<u>human IgE Fc (CH2-CH3-CH4) ORF</u> (nucleotide sequence)**

tgatcacgtctgctccagggacttcaccccgcccaccgtgaagatcttacagtcgtcctgcgacggcggcgggcacttcccccg
accatccagctcctgtgcctcgtctctgggtacaccccagggactatcaacatcacctggctggaggacgggcaggtcatggacg
tggacttgtccaccgcctctaccacgcaggagggtgagctggcctccacacaaagcgagctcaccctcagccagaagcactggc
tgtcagaccgcacctacacctgccaggtcacctatcaaggtcacacctttgaggacagcaccaagaagtgtgcagattccaaccc
gagaggggtgagcgcctacctaagccggcccagcccgttcgacctgttcatccgcaagtcgcccacgatcacctgtctggtggtg
gacctggcacccagcaaggggaccgtgaacctgacctggtcccgggccagtgggaagcctgtgaaccactccaccagaaagg
aggagaagcagcgcaatggcacgttaaccgtcacgtccaccctgccggtgggcacccgagactggatcgagggggagaccta
ccagtgcagggtgacccacccccacctgcccagggccctcatgcggtccacgaccaagaccagcggcccgcgtgctgccccg
gaagtctatgcgtttgcgacgccggagtggccggggagccgggacaagcgcaccctcgcctgcctgatccagaacttcatgcct

gaggacatctcggtgcagtggctgcacaacgaggtgcagctcccggacgcccggcacagcacgacgcagccccgcaagacc
aagggctccggcttcttcgtcttcagccgcctggaggtgaccagggccgaatgggagcagaaagatgagttcatctgccgtgcag
tccatgaggcagcgagccccctcacagaccgtccagcgagcggtgtctgtaaatcccggtaaagcggatccttcgaa

AA

**human IgE Fc (CH2-CH3-CH4) ORF (amino acid sequence)**

DHVCSRDFTPPTVKILQSSCDGGGHFPPTIQLLCLVSGYTPGTINITWLEDGQVMDV
DLSTASTTQEGELASTQSELTLSQKHWLSDRTYTCQVTYQGHTFEDSTKKCADSN
PRGVSAYLSRPSPFDLFIRKSPTITCLVVDLAPSKGTVNLTWSRASGKPVNHSTRKE
EKQRNGTLTVTSTLPVGTRDWIEGETYQCRVTHPHLPRALMRSTTKTSGPRAAPE
VYAFATPEWPGSRDKRTLACLIQNFMPEDISVQWLHNEVQLPDARHSTTQPRKTK
GSGFFVFSRLEVTRAEWEQKDEFICRAVHEAASPSQTVQRAVSVNPGKADPS

**1D8 scFv-human IgE Fc (CH2-CH3-CH4)-CD80 (nucleotide sequence)**

aagcttatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataatgtccagaggagtcgacatigtgctcactc
agtctccaacaaccatagctgcatctccaggggagaaggtcaccatcacctgccgtgccagctccagtgtaagttacatgtactggt
accagcagaagtcaggcgcctcccctaaactctggatttatgacacatccaagctggcttctggagttccaaatcgcttcagtggca
gtgggtctgggacctcttattctctcgcaatcaacaccatggagactgaagatgctgccacttattactgtcagcagtggagtagtact
ccgctcacgttcgggtctgggaccaagctggagatcaaacggggtggcggtggctcgggcggtggtgggtcgggtggcggcg
gatctcaggtgcagctgaaggaggcaggacctggcctggtgcaaccgacacagaccctgtccctcacatgcactgtctctgggtt
ctcattaaccagcgatggtgtacactggattcgacagcctccaggaaagggtctggaatggatgggaataatatattatgatggagg
cacagattataattcagcaattaaatccagactgagcatcagcagggacacctccaagagccaagttttcttaaaaatcaacagtctg
caaactgatgacacagccatgtattactgtgccagaatccactttgattactggggccaaggagtcatggtcacagtctcctctgatc
acgtctgctccagggacttcaccccgcccaccgtgaagatcttacagtcgtcctgcgacggcggcgggcacttcccccgaccat
ccagctcctgtgcctcgtctctgggtacaccccagggactatcaacatcacctggctggaggacgggcaggtcatggacgtggac
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gggtgagcgcctacctaagccggcccagcccgttcgacctgttcatccgcaagtcgcccacgatcacctgtctggtggtggacct
ggcacccagcaaggggaccgtgaacctgacctggtcccgggccagtgggaagcctgtgaaccactccaccagaaaggaggag
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cagggtgacccaccccccacctgcccagggccctcatgcggtccacgaccaagaccagcggcccgcgtgctgccccggaagtct
atgcgtttgcgacgccggagtggccggggagccgggacaagcgcaccctcgcctgcctgatccagaacttcatgcctgaggac

atctcggtgcagtggctgcacaacgaggtgcagctcccggacgcccggcacagcacgacgcagccccgcaagaccaagggct
ccggcttcttcgtcttcagccgcctggaggtgaccagggccgaatgggagcagaaagatgagttcatctgccgtgcagtccatga
ggcagcgagcccctcacagaccgtccagcgagcggtgtctgtaaatcccggtaaagcggatccttcgaagctcccatcctgggc
cattaccttaatctcagtaaatggaatttttgtgatatgctgcctgacctactgctttgccccaagatgcagagagagaaggaggaatg
agagattgagaagggaaagtgtacgccctgtataaatcgata

**1D8-scFv-human IgE Fc (CH2-CH3-CH4)-CD80 (amino acid sequence)**

MDFQVQIFSFLLISASVIMSRGVDIVLTQSPTTIAASPGEKVTITCRASSSVSYMYWY
QQKSGASPKLWIYDTSKLASGVPNRFSGSGSGTSYSLAINTMETEDAATYYCQQW
SSTPLTFGSGTKLEIKRGGGGSGGGGSGGGGSQVQLKEAGPGLVQPTQTLSLTCTV
SGFSLTSDGVHWIRQPPGKGLEWMGIIYYDGGTDYNSAIKSRLSISRDTSKSQVFLK
INSLQTDDTAMYYCARIHFDYWGQGVMVTVSSDHVCSRDFTPPTVKILQSSCDGG
GHFPPTIQLLCLVSGYTPGTINITWLEDGQVMDVDLSTASTTQEGELASTQSELTLS
QKHWLSDRTYTCQVTYQGHTFEDSTKKCADSNPRGVSAYLSRPSPFDLFIRKSPTI
TCLVVDLAPSKGTVNLTWSRASGKPVNHSTRKEEKQRNGTLTVTSTLPVGTRDWI
EGETYQCRVTHPHLPRALMRSTTKTSGPRAAPEVYAFATPEWPGSRDKRTLACLI
QNFMPEDISVQWLHNEVQLPDARHSTTQPRKTKGSGFFVFSRLEVTRAEWEQKDE
FICRAVHEAASPSQTVQRAVSVNPGKADPSKLPSWAITLISVNGIFVICCLTYCFAP
RCRERRRNERLRRESVRPV

**5B9-IgAH IgA-T4-CD80 (nucleotide sequence)**

aagcttgccgccatgaggttctctgctcagcttctggggctgcttgtgctctggatccctggatccactgcagatattgtgatgacgca
ggctgcattctccaatccagtcactcttggaacatcagcttccatctcctgcaggtctagtaagagtctcctacatagtaatggcatca
cttatttgtattggtatctgcagaagccaggccagtctcctcagctcctgatttatcagatgtccaaccttgcctcaggagtcccagaca
ggttcagtagcagtgggtcaggaactgatttcacactgagaatcagcagagtggaggctgaggatgtgggtgtttattactgtgctc
aaaatctagaacttccgctcacgttcggtgctgggaccaagctggagctgaaacggggtggcggtggctcgggcggtggtgggt
cgggtggcggcggatcgtcacaggtgcagctgaagcagtcaggacctggcctagtgcagtcctcacagagcctgtccatcacct
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aaaatgaacagtctgcaacctaatgacacagccatttattactgtgccagaaatgggggtgataactacccttattactatgctatgga
ctactggggtcaaggaacctcagtcaccgtctcctctgatcagccagttccctcaactccacctaccccatctccctcaactccacct

accccatctccctcatgctgccaccccccgactgtcactgcaccgaccggccctcgaggacctgctcttaggttcagaagcgatcct
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gccagggcaccaccaccttcgctgtgaccagcatactgcgcgtggcagccgaggactggaagaaggggacaccttctcctgc
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ctgttgtcatggcggaggtggacgcggatccttcgaacaacctgctcccatcctgggccattaccttaatctcagtaaatggaatttt
gtgatatgctgcctgacctactgctttgccccaagatgcagagagagaaggaggaatgagagattgagaagggaaagtgtacgcc
ctgtataaatcgatac

**5B9-IgAH IgA-T4-CD80 (amino acid sequence)**

MRFSAQLLGLLVLWIPGSTADIVMTQAAFSNPVTLGTSASISCRSSKSLLHSNGITY
LYWYLQKPGQSPQLLIYQMSNLASGVPDRFSSSGSGTDFTLRISRVEAEDVGVYYC
AQNLELPLTFGAGTKLELKRGGGGSGGGGSGGGGSSQVQLKQSGPGLVQSSQSLS
ITCTVSGFSLTTYAVHWVRQSPGKGLEWLGVIWSGGITDYNAAFISRLSITKDDSK
SQVFFKMNSLQPNDTAIYYCARNGGDNYPYYYAMDYWGQGTSVTVSSDQPVPST
PPTPSPSTPPTPSPSCCHPRLSLHRPALEDLLLGSEAILTCTLTGLRDASGVTFTWTPS
SGKSAVQGPPDRDLCGCYSVSSVLPGCAEPWNHGKTFTCTAAYPESKTPLTATLS
KSGNTFRPEVHLLPPPSEELALNELVTLTCLARGFSPKDVLVRWLQGSQELPREKY
LTWASRQEPSQGTTTFAVTSILRVAAEDWKKGDTFSCMVGHEALPLAFTQKTIDR
LAGKPTHVNVSVVMAEVDADPSNNLLPSWAITLISVNGIFVICCLTYCFAPRCRER
RRNERLRRESVRPV

**5B9-scFv-human IgE Fc (CH2-CH3-CH4)-CD80 (nucleotide sequence)**

aagcttgccgccatgaggttctctgctcagcttctggggctgcttgtgctctggatccctggatccactgcagatattgtgatgacgca
ggctgcattctccaatccagtcactcttggaacatcagcttccatctcctgcaggtctagtaagagtctcctacatagtaatggcatca
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ggttcagtagcagtgggtcaggaactgatttcacactgagaatcagcagagtggaggctgaggatgtgggtgtttattactgtgctc
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cgggtggcggcggatcgtcacaggtgcagctgaagcagtcaggacctggcctagtgcagtcctcacagagcctgtccatcacct
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aaaatgaacagtctgcaacctaatgacacagccatttattactgtgccagaaatgggggtgataactacccttattactatgctatgga
ctactggggtcaaggaacctcagtcaccgtctcctctgatcacgtctgctccagggacttcaccccgcccaccgtgaagatcttaca
gtcgtcctgcgacggcggcgggcacttcccccgaccatccagctcctgtgcctcgtctctgggtacaccccagggactatcaac
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tccgcaagtcgcccacgatcacctgtctggtggtggacctggcacccagcaaggggaccgtgaacctgacctggtcccgggcca
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ggcacccgagactggatcgaggggggagacctaccagtgcagggtgacccacccccacctgcccagggccctcatgcggtcca
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ccggcacagcacgacgcagccccgcaagaccaagggctccggcttcttcgtcttcagccgcctggaggtgaccagggccgaat
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atcccggtaaagcggatccttcgaagctcccatcctgggccattaccttaatctcagtaaatggaatttttgtgatatgctgcctgacct
actgctttgccccaagatgcagagagagaaggaggaatgagagattgagaagggaaagtgtacgccctgtataaatcgata

**<u>5B9-scFv-human IgE Fc (CH2-CH3-CH4)-CD80</u> (amino acid sequence)**

MRFSAQLLGLLVLWIPGSTADIVMTQAAFSNPVTLGTSASISCRSSKSLLHSNGITY
LYWYLQKPGQSPQLLIYQMSNLASGVPDRFSSSGSGTDFTLRISRVEAEDVGVYYC
AQNLELPLTFGAGTKLELKRGGGGSGGGGSGGGGSSQVQLKQSGPGLVQSSQSLS
ITCTVSGFSLTTYAVHWVRQSPGKGLEWLGVIWSGGITDYNAAFISRLSITKDDSK
SQVFFKMNSLQPNDTAIYYCARNGGDNYPYYYAMDYWGQGTSVTVSSDHVCSR
DFTPPTVKILQSSCDGGGHFPPTIQLLCLVSGYTPGTINITWLEDGQVMDVDLSTAS
TTQEGELASTQSELTLSQKHWLSDRTYTCQVTYQGHTFEDSTKKCADSNPRGVSA
YLSRPSPFDLFIRKSPTITCLVVDLAPSKGTVNLTWSRASGKPVNHSTRKEEKQRNG
TLTVTSTLPVGTRDWIEGETYQCRVTHPHLPRALMRSTTKTSGPRAAPEVYAFATP
EWPGSRDKRTLACLIQNFMPEDISVQWLHNEVQLPDARHSTTQPRKTKGSGFFVFS
RLEVTRAEWEQKDEFICRAVHEAASPSQTVQRAVSVNPGKADPSKLPSWAITLISV
NGIFVICCLTYCFAPRCRERRRNERLRRESVRPV

**2e12-scFv-IgAH IgA-T4-CD80 (nucleotide sequence)**

aagcttatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataatgtccagaggagtcgacattgtgctcaccc
aatctccagcttctttggctgtgtctctaggtcagagagccaccatctcctgcagagccagtgaaagtgttgaatattatgtcacaagtt
taatgcagtggtaccaacagaaaccaggacagccacccaaactcctcatctctgctgcatccaacgtagaatctggggtccctgcc
aggtttagtggcagtgggtctgggacagacttcagcctcaacatccatcctgtggaggaggatgatattgcaatgtatttctgtcagc
aaagtaggaaggttccttggacgttcggtggaggcaccaagctggaaatcaaacggggtggcggtggctcgggcggaggtggg
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acgtgcacactgaccggcctgagagatgcctcaggtgtcaccttcacctggacgccctcaagtgggaagagcgctgttcaaggac
cacctgaccgtgacctctgtggctgctacagcgtgtccagtgtcctgccgggctgtgccgagccatggaaccatgggaagaccttc
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ccagggcaccaccaccttcgctgtgaccagcatactgcgcgtggcagccgaggactggaagaaggggacaccttctcctgcat
ggtgggccacgaggccctgccgctggccttcacacagaagaccatcgaccgcttggcgggtaaacccacccatgtcaatgtgtct
gttgtcatggcggaggtggacgcggatccttcgaacaacctgctcccatcctgggccattaccttaatctcagtaaatggaatttttgt
gatatgctgcctgacctactgctttgccccaagatgcagagagagaaggaggaatgagagattgagaagggaaagtgtacgccct
gtataaatcgatac

**2e12-scFv-IgAH IgA-T4-CD80 (amino acid sequence)**

MDFQVQIFSFLLISASVIMSRGVDIVLTQSPASLAVSLGQRATISCRASESVEYYVTS
LMQWYQQKPGQPPKLLISAASNVESGVPARFSGSGSGTDFSLNIHPVEEDDIAMYF
CQQSRKVPWTFGGGTKLEIKRGGGGSGGGGSGGGGSQVQLKESGPGLVAPSQSLS
ITCTVSGFSLTGYGVNWVRQPPGKGLEWLGMIWGDGSTDYNSALKSRLSITKDNS
KSQVFLKMNSLQTDDTARYYCARDGYSNFHYYVMDYWGQGTSVTVSSDQPVPS
TPPTPSPSTPPTPSPSCCHPRLSLHRPALEDLLLGSEAILTCTLTGLRDASGVTFTWTP
SSGKSAVQGPPDRDLCGCYSVSSVLPGCAEPWNHGKTFTCTAAYPESKTPLTATLS

KSGNTFRPEVHLLPPPSEELALNELVTLTCLARGFSPKDVLVRWLQGSQELPREKY
LTWASRQEPSQGTTTFAVTSILRVAAEDWKKGDTFSCMVGHEALPLAFTQKTIDR
LAGKPTHVNVSVVMAEVDADPSNNLLPSWAITLISVNGIFVICCLTYCFAPRCRER
RRNERLRRESVRPV

**2e12-scFv-human IgE Fc (CH2-CH3-CH4)-CD80 (nucleotide sequence)**

aagcttatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataatgtccagaggagtcgacattgtgctcaccc
aatctccagcttctttggctgtgtctctaggtcagagagccaccatctcctgcagagccagtgaaagtgttgaatattatgtcacaagtt
taatgcagtggtaccaacagaaaccaggacagccacccaaactcctcatctctgctgcatccaacgtagaatctggggtccctgcc
aggtttagtggcagtgggtctgggacagacttcagcctcaacatccatcctgtggaggaggatgatattgcaatgtatttctgtcagc
aaagtaggaaggttccttggacgttcggtggaggcaccaagctggaaatcaaacggggtggcggtggctcgggcggaggtggg
tcgggtggcggcggatctcaggtgcagctgaaggagtcaggacctggcctggtggcgccctcacagagcctgtccatcacatgc
accgtctcagggttctcattaaccggctatggtgtaaactgggttcgccagcctccaggaaagggtctggagtggctgggaatgat
atggggtgatggaagcacagactataattcagctctcaaatccagactgagcatcaccaaggacaactccaagagccaagttttctt
aaaaatgaacagtctgcaaactgatgacacagccagatactactgtgccagagatggttatagtaactttcattacatatgttatggact
actggggtcaaggaacctcagtcaccgtctcctcagatcacgtctgctccagggacttcaccccgcccaccgtgaagatcttacag
tcgtcctgcgacggcggcgggcacttccccccgaccatccagctcctgtgcctcgtctctgggtacaccccagggactatcaacat
cacctggctggaggacgggcaggtcatggacgtggacttgtccaccgcctctaccacgcaggagggtgagctggcctccacac
aaagcgagctcaccctcagccagaagcactggctgtcagaccgcacctacacctgccaggtcacctatcaaggtcacacctttga
ggacagcaccaagaagtgtgcagattccaacccgagaggggtgagcgcctacctaagccggcccagcccgttcgacctgttcat
ccgcaagtcgcccacgatcacctgtctggtggtggacctggcacccagcaaggggaccgtgaacctgacctggtcccgggcca
gtgggaagcctgtgaaccactccaccagaaaggaggagaagcagcgcaatggcacgttaaccgtcacgtccaccctgccggtg
ggcacccgagactggatcgaggggagacctaccagtgcagggtgacccacccccacctgcccagggccctcatgcggtcca
cgaccaagaccagcggcccgcgtgctgccccggaagtctatgcgtttgcgacgccggagtggccggggagccgggacaagc
gcaccctcgcctgcctgatccagaacttcatgcctgaggacatctcggtgcagtggctgcacaacgaggtgcagctcccggacgc
ccggcacagcacgacgcagccccgcaagaccaagggctccggcttcttcgtcttcagccgcctggaggtgaccagggccgaat
gggagcagaaagatgagttcatctgccgtgcagtccatgaggcagcgagcccctcacagaccgtccagcgagcggtgtctgtaa
atcccggtaaagcggatccttcgaagctcccatcctgggccattaccttaatctcagtaaatggaatttttgtgatatgctgcctgacct
actgctttgccccaagatgcagagagagaaggaggaatgagagattgagaagggaaagtgtacgccctgtataaatcgata

**2e12-scFv-human IgE Fc (CH2-CH3-CH4)-CD80 (amino acid sequence)**

MDFQVQIFSFLLISASVIMSRGVDIVLTQSPASLAVSLGQRATISCRASESVEYYVTS
LMQWYQQKPGQPPKLLISAASNVESGVPARFSGSGSGTDFSLNIHPVEEDDIAMYF
CQQSRKVPWTFGGGTKLEIKRGGGGSGGGGSGGGGSQVQLKESGPGLVAPSQSLS
ITCTVSGFSLTGYGVNWVRQPPGKGLEWLGMIWGDGSTDYNSALKSRLSITKDNS
KSQVFLKMNSLQTDDTARYYCARDGYSNFHYYVMDYWGQGTSVTVSSDHVCSR
DFTPPTVKILQSSCDGGGHFPPTIQLLCLVSGYTPGTINITWLEDGQVMDVDLSTAS
TTQEGELASTQSELTLSQKHWLSDRTYTCQVTYQGHTFEDSTKKCADSNPRGVSA
YLSRPSPFDLFIRKSPTITCLVVDLAPSKGTVNLTWSRASGKPVNHSTRKEEKQRNG
TLTVTSTLPVGTRDWIEGETYQCRVTHPHLPRALMRSTTKTSGPRAAPEVYAFATP
EWPGSRDKRTLACLIQNFMPEDISVQWLHNEVQLPDARHSTTQPRKTKGSGFFVFS
RLEVTRAEWEQKDEFICRAVHEAASPSQTVQRAVSVNPGKADPSKLPSWAITLISV
NGIFVICCLTYCFAPRCRERRRNERLRRESVRPV

**500A2 scFv (nucleotide sequence)**

atgttgtatacatctcagctccttgggcttttactcttctggatttcagcctccagaagtgacatagtgctgactcagactccagccactc
tgtctctaattcctggagaaagagtcacaatgacctgtaagaccagtcagaatattggcacaatcttacactggtatcaccaaaaacc
aaaggaggctccaagggctctcatcaagtatgcttcgcagtccattcctgggatcccctccagattcagtggcagtggttcggaaac
agatttcactctcagcatcaataacctggagcctgatgatatcggaatttattactgtcaacaaagtagaagctggcctgtcacgttcg
gtcctggcaccaagctggagataaaacggggtggcggtggctcgggcggaggtgggtcgggtggcggcggatctcaggtcaa
gctgcagcagtccggttctgaactagggaaacctggggcctcagtgaaactgtcctgcaagacttcaggctacatattcacagatc
actatatttcttgggtgaaacagaagcctggagaaagcctgcagtggataggaaatgtttatggtggaaatggtggtacaagctaca
atcaaaaattccagggcaaggccacactgactgtagataaaatctctagcacagcctacatggaactcagcagcctgacatctgag
gattctgccatctattactgtgcaagaaggccggtagcgacgggccatgctatggactactggggtcaggggatccaagttaccgt
ctcctctgatc

**500A2 scFv (amino acid sequence)**

MLYTSQLLGLLLFWISASRSDIVLTQTPATLSLIPGERVTMTCKTSQNIGTILHWYH
QKPKEAPRALIKYASQSIPGIPSRFSGSGSETDFTLSINNLEPDDIGIYYCQQSRSWPV
TFGPGTKLEIKRGGGGSGGGGSGGGGSQVKLQQSGSELGKPGASVKLSCKTSGYIF
TDHYISWVKQKPGESLQWIGNVYGGNGGTSYNQKFQGKATLTVDKISSTAYMEL
SSLTSEDSAIYYCARRPVATGHAMDYWGQGIQVTVSSD

NT

5' oligo:

Name : IgGWT3

GTTGTTTTCGAAGGATCCGCTTTACCCGGAGACAGGGAGAGGCTCTT

NT

3' oligo:

Name : hIgGWT5

GTTGTTAGATCTGGAGCCCAAATCTTGTGACAAAACTCACACATG

NT

5' oligo:

Name : FADD5

Sequence

GTTGTGGATCCTTCGAACCCGTTCCTGGTGCTGCTGCACTCGGTGTCG

NT

3' oligo:

Name : FADD3

Sequence

GTTGTTATCGATCTCGAGTTATCAGGACGCTTCGGAGGTAGATGCGTC

NT

**FADD-CSSCFV (nucleotide sequence)**

gtggatccttcgaacccgttcctggtgctgctgcactcggtgtcgtccagcctgtcgagcagcgagctgaccgagctcaagttccta
tgcctcgggcgcgtgggcaagcgcaagctggagcgcgtgcagagcggcctagacctcttctccatgctgctggagcagaacga
cctggagcccgggcacaccgagctcctgcgcgagctgctcgcctccctgcggcgccacgacctgctgcggcgcgtcgacgact
tcgaggcgggggcggcggccggggccgcgcctggggaagaagacctgtgtgcagcatttaacgtcatatgtgataatgtgggg
aaagattggagaaggctggctcgtcagctcaaagtctcagacaccaagatcgacagcatcgaggacagatacccccgcaacctg
acagagcgtgtgcgggagtcactgagaatctggaagaacacagagaaggagaacgcaacagtggcccacctggtgggggctc
tcaggtcctgccagatgaacctggtggctgacctggtacaagaggttcagcaggcccgtgacctccagaacaggagtggggcca
tgtccccgatgtcatggaactcagacgcatctacctccgaagcgtcctgataactcgagatcgataacaac

**FADD-CSSCFV (amino acid sequence)**

VDPSNPFLVLLHSVSSSLSSSELTELKFLCLGRVGKRKLERVQSGLDLFSMLLEQND
LEPGHTELLRELLASLRRHDLLRRVDDFEAGAAAGAAPGEEDLCAAFNVICDNVG
KDWRRLARQLKVSDTKIDSIEDRYPRNLTERVRESLRIWKNTEKENATVAHLVGA
LRSCQMNLVADLVQEVQQARDLQNRSGAMSPMSWNSDASTSEAS

**HCD28tm5B (nucleotide sequence)**

GTTGTGGATCCTCCCTTTTGGGTGCTGGTGGTGGTTGGTGTCCTGGCTTGCTAT
AGCTTG

**HCD28tm3S (nucleotide sequence)**

GTTGTTTCGAACCCAGAAAATAATAAAGGCCACTGTTACTAGCAAGCTATAGC
AAGCCAG

**HCD28tm5' (nucleotide sequence)**

GTTGTGGATCCTCCCTTTTGGGTGCTGGTGGT

**HCD28tm3' (nucleotide sequence)**

GTTGTTTCGAACCCAGAAAATAATAAAGGCCAC

**HCD80tm5' (nucleotide sequence)**

GTTGTGGATCCTCCTGCTCCCATCCTGG

**HCD80tm3' (nucleotide sequence)**

GTTGTTTCGAACGGCAAAGCAGTAGGTCAGGC

**MFADD5BB (nucleotide sequence)**

GTTGTGGATCCTTCGAACCCATTCCTGGTGCTGCTGCACTCGCTG

**MFADD3XC (nucleotide sequence)**

GTTGTTATCGATCTCGAGTCAGGGTGTTTCTGAGGAAGACAC

**Murine FADD nucleotide sequence** (full length, but without flanking –Ig or transmembrane sequences) **(nucleotide sequence)**

gtggatccttcgaacatggacccattcctggtgctgctgcactcgctgtccggcagcctgtcgggcaacgatctgatggagctcaa
gttcttgtgccgcgagcgcgtgagcaaacgaaagctggagcgcgtgcagagtggcctggacctgttcacggtgctgctggagca
gaacgacctggagcgcgggcacaccgggctgctgcgcgagttgctggcctcgctgcgccgacacgatctactgcagcgcctgg
acgacttcgaggcggggacggcgaccgctgcgcccccgggggaggcagatctgcaggtggcatttgacattgtgtgtgacaatg
tggggagagactggaaaagactggcccgcgagctgaaggtgtctgaggccaagatggatgggattgaggagaagtaccccg
aagtctgagtgagcgggtaagggagagtctgaaagtctggaagaatgctgagaagaagaacgcctcggtggccggactggtca
aggcgctgcggacctgcaggctgaatctggtggctgacctggtggaagaagcccaggaatctgtgagcaagagtgagaatatgt
ccccagtactaagggattcaactgtgtcttcctcagaaacaccctgactcgagatcgat

**Murine FADD (amino acid sequence)**

VDPSNMDPFLVLLHSLSGSLSGNDLMELKFLCRERVSKRKLERVQSGLDLFTVLLE
QNDLERGHTGLLRELLASLRRHDLLQRLDDFEAGTATAAPPGEADLQVAFDIVCD
NVGRDWKRLARELKVSEAKMDGIEEKYPRSLSERVRESLKVWKNAEKKNASVA
GLVKALRTCRLNLVADLVEEAQESVSKSENMSPVLRDSTVSSSETP

**MCASP3-5 (nucleotide sequence)**

GTTGTGGATCCTTCGAACATGGAGAACAACAAAACCTCAGTGGATTCA

**MCASP3-3 (nucleotide sequence)**

GTTGTTATCGATCTCGAGCTAGTGATAAAAGTACAGTTCTTTCGT

**MCASP8-5 (nucleotide sequence)**

GTTGTTTCGAACATGGATTTCCAGAGTTGTCTTTATGCTATTGCTG

**MCASP8-3 (nucleotide sequence)**

GTTGTTATCGATCTCGAGTCATTAGGGAGGGAAGAAGAGCTTCTTCCG

**hcasp3-5(nucleotide sequence)**

GTTGTGGATCCTTCGAACATGGAGAACACTGAAAACTCAGTGGAT

**hcasp3-3 (nucleotide sequence)**

GTTGTTATCGATCTCGAGTTAGTGATAAAAATAGAGTTCTTTTGTGAG

**hcasp8-5 (nucleotide sequence)**

GTTGTGGATCCTTCGAACATGGACTTCAGCAGAAATCTTTATGAT

**hcasp8-3 (nucleotide sequence)**

GTTGTTATCGATGCATGCTCAATCAGAAGGGAAGACAAGTTTTTTTCT

**1. 2H7 scFv with alternative VHL11 mutations:**

Nucleotide sequence

Aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctc
tcccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcac
tggtaccagcagaagccaggatcctcccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagt
ggcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagt
tttaacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggt
gggagctctcaggcttatctacagcagtctggggctgag (**one of the following: tcn, acn, gan, can, aan, cgn, agn)**
gtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggctacacatttaccagttacaatatgcactgggtaaagcagaca
cctagacagggcctggaatggattggagctatttatccaggaaatggtgatacttcctacaatcagaagttcaagggcaaggccac
actgactgtagacaaatcctccagcacagcctacatgcagctcagcagcctgacatctgaagactctgcggtctatttctgtgcaag
agtggtgtactatagtaactcttactggtacttcgatgtctggggcacagggaccacggtcaccgtctcttctgatcag

Amino acid sequence

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAE **(one of the following: S, T, D, E, Q, N, R, K, H)**
VRPGASVKMSCKASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFK

GKATLTVDKSSSTAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVT
VSSDQ

2. **VHL11 deletion**

Nucleotide sequence:
Aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctc
tcccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcac
tggtaccagcagaagccaggatcctccccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagt
ggcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagt
tttaacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggt
gggagctctcaggcttatctacagcagtctggggct**gaggtg**aggcctggggcctcagtgaagatgtcctgcaaggcttctggct
acacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaatg
gtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcagc
agcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcaca
gggaccacggtcaccgtctcttctgatcag

Amino acid sequence:
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGA**E**VRPGASVKMSCKA
SGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSST
AYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQ

3. **2H7 VL L106 with alternative mutations**

**Nucleotide sequence:**
aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctccccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggag **(tcn, agn, aan, cgn, can, gan, and non-natural derivatives of these codons)** aaagatggcggtggctcgggcggtggtggatctggaggaggtgggagctc

Amino acid sequence:
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLE **(S, T, R, K, H, Q, N, D, E, and non-natural derivatives of these amino acids at position 106)**KDGGGSGGGGSGGGGSS

4. **VL L106 deletion**

Nucleotide sequence:
Aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctc
tcccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcac
tggtaccagcagaagccaggatcctccccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagt
ggcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagt
tttaacccacccacgttcggtgctgggaccaagctg**gagaaa**gatggcggtggctcgggcggtggtggatctggaggaggtgg
gagctc

Amino acid sequence:

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKL**EK**DGGGSGGGGSGGGGSS

5. **IgE CH3 CH4**

Nucleotide sequence:

tccaacccgagaggggtgagcgcctacctaagccggcccagcccgttcgacctgttcatccgcaagtcgcccacgatcacctgtc
tggtggtggacctggcacccagcaaggggaccgtgaacctgacctggtcccgggccagtgggaagcctgtgaaccactccacc
agaaaggaggagaagcagcgcaatggcacgttaaccgtcacgtccaccctgccggtgggcacccgagactggatcgagggggg
agacctaccagtgcagggtgacccacccccacctgcccagggccctcatgcggtccacgaccaagaccagcggcccgcgtgct
gccccggaagtctatgcgtttgcgacgccggagtggccggggagccgggacaagcgcaccctcgcctgcctgatccagaactt
catgcctgaggacatctcggtgcagtggctgcacaacgaggtgcagctcccggacgcccggcacagcacgacgcagccccgc
aagaccaagggctccggcttcttcgtcttcagccgcctggaggtgaccagggccgaatgggagcagaaagatgagttcatctgcc
gtgcagtccatgaggcagcgagcccctcacagaccgtccagcgagcggtgtctgtaaatcccggtaaatgataatctagaa

Amino acid sequence:

SNPRGVSAYLSRPSPFDLFIRKSPTITCLVVDLAPSKGTVNLTWSRASGKPVNHSTR
KEEKQRNGTLTVTSTLPVGTRDWIEGETYQCRVTHPHLPRALMRSTTKTSGPRAA
PEVYAFATPEWPGSRDKRTLACLIQNFMPEDISVQWLHNEVQLPDARHSTTQPRK
TKGSGFFVFSRLEVTRAEWEQKDEFICRAVHEAASPSQTVQRAVSVNPGK

**6. hIgG1H/IgE WCH3 WCH4**

Nucleotide sequence:

tgatcaggagcccaaatcttctgacaaaactcacacatcccccaccgtccccagcatccaaccccgagaggggtgagcgcctaccta
agccggcccagccccgttcgacctgttcatccgcaagtcgcccacgatcacctgtctggtggtggacctggcacccagcaagggg
accgtgaacctgacctggtcccgggccagtgggaagcctgtgaaccactccaccagaaaggaggagaagcagcgcaatggca
cgttaaccgtcacgtccaccctgccggtgggcacccgagactggatcgagggggagacctaccagtgcagggtgaccccaccc
cacctgcccagggccctcatgcggtccacgaccaagaccagcggcccgcgtgctgccccggaagtctatgcgtttgcgacgcc
ggagtggccggggagccgggacaagcgcaccctcgcctgcctgatccagaacttcatgcctgaggacatctcggtgcagtggct
gcacaacgaggtgcagctcccggacgcccggcacagcacgacgcagccccgcaagaccaagggctccggcttcttcgtcttca
gccgcctggaggtgaccagggccgaatgggagcagaaagatgagttcatctgccgtgcagtccatgaggcagcgagccctca
cagaccgtccagcgagcggtgtctgtaaatcccggtaaatgataatctagaa

Amino acid sequence:

DQEPKSSDKTHTSPPSPASNPRGVSAYLSRPSPFDLFIRKSPTITCLVVDLAPSKGTV
NLTWSRASGKPVNHSTRKEEKQRNGTLTVTSTLPVGTRDWIEGETYQCRVTHPHL
PRALMRSTTKTSGPRAAPEVYAFATPEWPGSRDKRTLACLIQNFMPEDISVQWLH
NEVQLPDARHSTTQPRKTKGSGFFVFSRLEVTRAEWEQKDEFICRAVHEAASPSQT
VQRAVSVNPGK

7. **IgE WCH2 WCH3 WCH4**

Nucleotide sequence:

Tgatcacgtctgctccagggacttcaccccgcccaccgtgaagatcttacagtcgtcctgcgacggcggcgggcacttcccccg
accatccagctcctgtgcctcgtctctgggtacaccccagggactatcaacatcacctggctggaggacgggcaggtcatggacg
tggacttgtccaccgcctctaccacgcaggagggtgagctggcctccacacaaagcgagctcaccctcagccagaagcactggc
tgtcagaccgcacctacacctgccaggtcacctatcaaggtcacacctttgaggacagcaccaagaagtgtgcagattccaaccc
gagaggggtgagcgcctacctaagccggcccagcccgttcgacctgttcatccgcaagtcgcccacgatcacctgtctggtggtg
gacctggcacccagcaaggggaccgtgaacctgacctggtcccgggccagtgggaagcctgtgaaccactccaccagaaagg
aggagaagcagcgcaatggcacgttaaccgtcacgtccaccctgccggtgggcacccgagactggatcgagggggagaccta
ccagtgcagggtgacccacccccacctgcccagggccctcatgcggtccacgaccaagaccagcggcccgcgtgctgccccg
gaagtctatgcgtttgcgacgccggagtggccggggagccgggacaagcgcaccctcgcctgcctgatccagaacttcatgcct

gaggacatctcggtgcagtggctgcacaacgaggtgcagctcccggacgcccggcacagcacgacgcagccccgcaagacc
aagggctccggcttcttcgtcttcagccgcctggaggtgaccagggccgaatgggagcagaaagatgagttcatctgccgtgcag
tccatgaggcagcgagcccctcacagaccgtccagcgagcggtgtctgtaaatcccggtaaatgataatctaga

Amino acid sequence:
DHVCSRDFTPPTVKILQSSCDGGGHFPPTIQLLCLVSGYTPGTINITWLEDGQVMDV
DLSTASTTQEGELASTQSELTLSQKHWLSDRTYTCQVTYQGHTFEDSTKKCADSN
PRGVSAYLSRPSPFDLFIRKSPTITCLVVDLAPSKGTVNLTWSRASGKPVNHSTRKE
EKQRNGTLTVTSTLPVGTRDWIEGETYQCRVTHPHLPRALMRSTTKTSGPRAAPE
VYAFATPEWPGSRDKRTLACLIQNFMPEDISVQWLHNEVQLPDARHSTTQPRKTK
GSGFFVFSRLEVTRAEWEQKDEFICRAVHEAASPSQTVQRAVSVNPGK

8. **hIgG1H/IgE CH3 CH4 (ORF)**
Nucleotide sequence:
tgatcaggagcccaaatcttctgacaaaactcacacatcccccaccgtccccagcatccaaccccgagaggggtgagcgcctaccta
agccggcccagcccgttcgacctgttcatccgcaagtcgcccacgatcacctgtctggtggtggacctggcacccagcaagggg
accgtgaacctgacctggtcccgggccagtgggaagcctgtgaaccactccaccagaaaggaggagaagcagcgcaatggca
cgttaaccgtcacgtccaccctgccggtgggcacccgagactggatcgaggggggagacctaccagtgcagggtgacccacccc
cacctgcccagggccctcatgcggtccacgaccaagaccagcggcccgcgtgctgccccggaagtctatgcgtttgcgacgcc
ggagtggccggggagccgggacaagcgcaccctcgcctgcctgatccagaacttcatgcctgaggacatctcggtgcagtggct
gcacaacgaggtgcagctcccggacgcccggcacagcacgacgcagccccgcaagaccaagggctccggcttcttcgtcttca
gccgcctggaggtgaccagggccgaatgggagcagaaagatgagttcatctgccgtgcagtccatgaggcagcgagccctca
cagaccgtccagcgagcggtgtctgtaaatcccggtaaagcggatccttcgaa

Amino acid sequence:
DQEPKSSDKTHTSPPSPASNPRGVSAYLSRPSPFDLFIRKSPTITCLVVDLAPSKGTV
NLTWSRASGKPVNHSTRKEEKQRNGTLTVTSTLPVGTRDWIEGETYQCRVTHPHL
PRALMRSTTKTSGPRAAPEVYAFATPEWPGSRDKRTLACLIQNFMPEDISVQWLH
NEVQLPDARHSTTQPRKTKGSGFFVFSRLEVTRAEWEQKDEFICRAVHEAASPSQT
VQRAVSVNPGKSGSFE

9. **2H7 VHL11S scFv hIgG1(SSS-S)H hIgE WCH3 WCH4**
Nucleotide sequence:
aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtcggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttctgacaaaactcacacatcccccaccgtcc**tca**gcatccaacc
cgagaggggtgagcgcctacctaagccggcccagcccgttcgacctgttcatccgcaagtcgcccacgatcacctgtctggtggt
ggacctggcacccagcaaggggaccgtgaacctgacctggtcccgggccagtgggaagcctgtgaaccactccaccagaaag
gaggagaagcagcgcaatggcacgttaaccgtcacgtccaccctgccggtgggcacccgagactggatcgaggggggagacct
accagtgcagggtgacccacccccacctgcccagggccctcatgcggtccacgaccaagaccagcggcccgcgtgctgcccc
ggaagtctatgcgtttgcgacgccggagtggccggggagccgggacaagcgcaccctcgcctgcctgatccagaacttcatgcc
tgaggacatctcggtgcagtggctgcacaacgaggtgcagctcccggacgcccggcacagcacgacgcagccccgcaagacc
aagggctccggcttcttcgtcttcagccgcctggaggtgaccagggccgaatgggagcagaaagatgagttcatctgccgtgcag
tccatgaggcagcgagccctcacagaccgtccagcgagcggtgtctgtaaatcccggtaaatgataatctaga

Amino acid sequence:
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSSDK
THTSPPSSASNPRGVSAYLSRPSPFDLFIRKSPTITCLVVDLAPSKGTVNLTWSRASG
KPVNHSTRKEEKQRNGTLTVTSTLPVGTRDWIEGETYQCRVTHPHLPRALMRSTT
KTSGPRAAPEVYAFATPEWPGSRDKRTLACLIQNFMPEDISVQWLHNEVQLPDAR
HSTTQPRKTKGSGFFVFSRLEVTRAEWEQKDEFICRAVHEAASPSQTVQRAVSVNP
GK

10. **2H7 VHL11S scFv hIgG1(SSS-P)H hIgE WCH3 WCH4**

Nucleotide sequence:
aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtcggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttctgacaaaactcacacatcccccaccgtcccagcatccaacc
cgagaggggtgagcgcctacctaagccggcccagcccgttcgacctgttcatccgcaagtcgcccacgatcacctgtctggtggt
ggacctggcacccagcaaggggaccgtgaacctgacctggtcccgggccagtgggaagcctgtgaaccactccaccagaaag
gaggagaagcagcgcaatggcacgttaaccgtcacgtccaccctgccggtgggcacccgagactggatcgaggggagacct
accagtgcagggtgacccacccccacctgcccagggccctcatgcggtccacgaccaagaccagcggcccgcgtgctgcccc
ggaagtctatgcgtttgcgacgccggagtggccggggagccgggacaagcgcaccctcgcctgcctgatccagaacttcatgcc
tgaggacatctcggtgcagtggctgcacaacgaggtgcagctcccggacgcccggcacagcacgacgcagccccgcaagacc
aagggctccggcttcttcgtcttcagccgcctggaggtgaccagggccgaatgggagcagaaagatgagttcatctgccgtgcag
tccatgaggcagcgagcccctcacagaccgtccagcgagcggtgtctgtaaatcccggtaaatgataatctaga

Amino acid sequence:
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSSDK
THTSPPSPASNPRGVSAYLSRPSPFDLFIRKSPTITCLVVDLAPSKGTVNLTWSRASG
KPVNHSTRKEEKQRNGTLTVTSTLPVGTRDWIEGETYQCRVTHPHLPRALMRSTT
KTSGPRAAPEVYAFATPEWPGSRDKRTLACLIQNFMPEDISVQWLHNEVQLPDAR
HSTTQPRKTKGSGFFVFSRLEVTRAEWEQKDEFICRAVHEAASPSQTVQRAVSVNP
GK

10. **2H7 VL L106S**
aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg

gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctc

Amino acid sequence:
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLESKDGGGSGGGGSGGGGSS

**11. 2H7 VL L106S scFv**
Nucleotide sequence:
aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctcccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggag**tct**aaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgag**ctg**gtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcag

Amino acid sequence:
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLESKDGGGSGGGGSGGGGSSQAYLQQSGAE**L**VRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQ

**12. 2H7 scFv VL L106S VHL11S scFv**
Nucleotide sequence:
Aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctc
tcccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcac
tggtaccagcagaagccaggatcctcccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagt
ggcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagt
tttaacccacccacgttcggtgctgggaccaagctggag**tct**aaagatggcggtggctcgggcggtggtggatctggaggaggt
gggagctctcaggcttatctacagcagtctggggctgag**tcg**gtgaggcctggggcctcagtgaagatgtcctgcaaggcttctg
gctacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaa
atggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctc
agcagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggc
acagggaccacggtcaccgtctcttctgatcag

Amino acid sequence:
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLESKDGGGSGGGGSGGGGSSQAYLQQSGAE**S**VRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQ

**10. Human IgD hinge linker with attached restriction sites**
Nucleotide:

gtggatccaggttcgaagtctccaaaggcacaggcctcctccgtgcccactgcacaaccccaagcagagggcagcctcgccaa
ggcaaccacagccccagccaccacccgtaacacaggaagaggaggagaagagaagaaggagaaggagaaagaggaa
caagaagagagagagacaaagaccggtgcagtcgacg

Amino acid:
VDPGSKSPKAQASSVPTAQPQAEGSLAKATTAPATTRNTGRGGEEKKKEKEKEEQ
EERETKTGAVD

**Sequence of Native IgD hinge domain:**
(includes a cysteine residue—we truncated the hinge prior to that residue for these constructs:)
Nucleotide:
gagtctccaaaggcacaggcctcctccgtgcccactgcacaaccccaagcagagggcagcctcgccaaggcaaccacagccc
cagccaccacccgtaacacaggaagaggaggagaagagaagaaggagaaggagaaagaggaacaagaagagagaga
gacaaagacaccagagtgtccgagccacacccagcctcttggcgtctacctgctaacccct

Amino acid sequence:
ESPKAQASSVPTAQPQAEGSLAKATTAPATTRNTGRGGEEKKKEKEKEEQEERET
KTPECPSHTQPLGVYLLTP

**12. 2H7 VH L11S**
Nucleotide sequence:
caggcttatctacagcagtctggggctgagtcggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggctacacattt
accagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaatggtgatact
tcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcagcagcctga
catctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcacagggacc
acggtcaccgtctcttct

Amino acid sequence:
QAYLQQSGAESVRPGASVKMSCKASGYTFTSYNMHWVKQTPRQGLEWIGAIYPG
NGDTSYNQKFKGKATLTVDKSSSTAYMQLSSLTSEDSAVYFCARVVYYSNSYWY
FDVWGTGTTVTVSS

**13. 2H7 VH L11S scFv**
Nucleotide sequence:
aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctcccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtcggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcag

Amino acid sequence:
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK

ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQ

**14. 2H7 scFv VH L11S hIgG1 (CSC-S)H WCH2 WCH3**

Nucleotide sequence:

aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctcccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtctgtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggct
acacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaatg
gtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcagc
agcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcaca
gggaccacggtcaccgtctcttctgatcaggagcccaaatcttgtgacaaaactcacacatctccaccgtgctcagcacctgaactc
ctgggtggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggacccctgaggtcacatgcgtggt
ggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagc
cgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggag
tacaagtgcaaggtctccaacaaagccctcccagccccatcgagaaaacaatctccaaagccaaagggcagccccgagaacc
acaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatcca
agcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacg
gctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgag
gctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSCDK
THTSPPCSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWY
VDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
NNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSL
SPGK

**15. 2H7 scFv VH L11S IgE WCH2 WCH3 WCH4**

Nucleotide sequence:

aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctcccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtctgtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggct
acacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaatg
gtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcagc
agcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcaca
gggaccacggtcaccgtctcttctgatcacgtctgctccagggacttcaccccgcccaccgtgaagatcttacagtcgtcctgcgac
ggcggcgggcacttcccccgaccatccagctcctgtgcctcgtctctgggtacaccccagggactatcaacatcacctggctgg
aggacgggcaggtcatggacgtggacttgtccaccgcctctaccacgcaggagggtgagctggcctccacacaaagcgagctc
accctcagccagaagcactggctgtcagaccgcacctacacctgccaggtcacctatcaaggtcacaccttgaggacagcacca

agaagtgtgcagattccaacccgagaggggtgagcgcctacctaagccggcccagcccgttcgacctgttcatccgcaagtcgc
ccacgatcacctgtctggtggtggacctggcacccagcaaggggaccgtgaacctgacctggtcccgggccagtgggaagcct
gtgaaccactccaccagaaaggaggagaagcagcgcaatggcacgttaaccgtcacgtccaccctgccggtgggcacccgag
actggatcgaggggagacctaccagtgcagggtgacccacccccacctgcccagggccctcatgcggtccacgaccaagac
cagcggcccgcgtgctgccccggaagtctatgcgtttgcgacgccggagtggccggggagccgggacaagcgcaccctcgcc
tgcctgatccagaacttcatgcctgaggacatctcggtgcagtggctgcacaacgaggtgcagctcccggacgcccggcacagc
acgacgcagccccgcaagaccaagggctccggcttcttcgtcttcagccgcctggaggtgaccagggccgaatgggagcagaa
agatgagttcatctgccgtgcagtccatgaggcagcgagcccctcacagaccgtccagcgagcggtgtctgtaaatcccggtaaa
tgataatctaga

Amino acid sequence:
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDHVCSRDFT
PPTVKILQSSCDGGGHFPPTIQLLCLVSGYTPGTINITWLEDGQVMDVDLSTASTTQ
EGELASTQSELTLSQKHWLSDRTYTCQVTYQGHTFEDSTKKCADSNPRGVSAYLS
RPSPFDLFIRKSPTITCLVVDLAPSKGTVNLTWSRASGKPVNHSTRKEEKQRNGTLT
VTSTLPVGTRDWIEGETYQCRVTHPHLPRALMRSTTKTSGPRAAPEVYAFATPEW
PGSRDKRTLACLIQNFMPEDISVQWLHNEVQLPDARHSTTQPRKTKGSGFFVFSRL
EVTRAEWEQKDEFICRAVHEAASPSQTVQRAVSVNPGK

**16. 2H7 scFv VH L11S mIgE WCH2 WCH3 WCH4**

Nucleotide sequence:
aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtctgtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggct
acacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaatg
gtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcagc
agcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcaca
gggaccacggtcaccgtctcttctgatcacgttcgacctgtcaacatcactgagcccaccttggagctactccattcatcctgcgacc
ccaatgcattccactccaccatccagctgtactgcttcatttatggccacatcctaaatgatgtctctgtcagctggctaatggacgatc
gggagataactgatacacttgcacaaactgttctaatcaaggaggaaggcaaactagcctctacctgcagtaaactcaacatcactg
agcagcaatggatgtctgaaagcaccttcacctgcaaggtcacctcccaaggcgtagactatttggcccacactcggagatgccca
gatcatgagccacggggtgtgattacctacctgatcccacccagcccccctggacctgtatcaaaacggtgctcccaagcttacctgt
ctggtggtggacctggaaagcgagaagaatgtcaatgtgacgtggaaccaagagaagaagacttcagtctcagcatcccagtggt
acactaagcaccacaataacgccacaactagtatcacctccatcctgcctgtagttgccaaggactggattgaaggctacggctatc
agtgcatagtggaccaccctgattttcccaagcccattgtgcgttccatcaccaagaccccaggccagcgctcagccccgaggta
tatgtgttcccaccaccagaggaggagagcgaggacaaacgcacactcacctgtttgatccagaacttcttccctgaggatatctct
gtgcagtggctgggggatggcaaactgatctcaaacagccagcacagtaccacaacacccctgaaatccaatggctccaatcaa
ggcttcttcatcttcagtcgcctagaggtcgccaagacactctggacacagagaaaacagttcacctgccaagtgatccatgaggc
acttcagaaacccaggaaactggagaaaacaatatccacaagccttggtaacacctccctccgtccatcctagtaatctagag

Amino acid sequence:
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK

ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDHVRPVNIT
EPTLELLHSSCDPNAFHSTIQLYCFIYGHILNDVSVSWLMDDREITDTLAQTVLIKE
EGKLASTCSKLNITEQQWMSESTFTCKVTSQGVDYLAHTRRCPDHEPRGVITYLIP
PSPLDLYQNGAPKLTCLVVDLESEKNVNVTWNQEKKTSVSASQWYTKHHNNATT
SITSILPVVAKDWIEGYGYQCIVDHPDFPKPIVRSITKTPGQRSAPEVYVFPPPEEESE
DKRTLTCLIQNFFPEDISVQWLGDGKLISNSQHSTTTPLKSNGSNQGFFIFSRLEVAK
TLWTQRKQFTCQVIHEALQKPRKLEKTISTSLGNTSLRPS

**17. 2H7 scFv VH L11S hIgA WH WCH2 T4CH3**

Nucleotide sequence:

aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtctgtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggct
acacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaatg
gtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcagc
agcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcaca
gggaccacggtcaccgtctcttctgatcagccagttccctcaactccacctaccccatctccctcaactccacctaccccatctccct
catgctgccaccccgactgtcactgcaccgaccggccctcgaggacctgctcttaggttcagaagcgatcctcacgtgcacactg
accggcctgagagatgcctcaggtgtcaccttcacctggacgccctcaagtgggaagagcgctgttcaaggaccacctgaccgtg
acctctgtggctgctacagcgtgtccagtgtcctgccgggctgtgccgagccatggaaccatgggaagaccttcacttgcactgct
gcctaccccgagtccaagaccccgctaaccgccaccctctcaaaatccggaaacacattccggccgaggtccacctgctgccg
ccgccgtcggaggagctggccctgaacgagctggtgacgctgacgtgcctggcacgtggcttcagccccaaggatgtgctggtt
cgctggctgcaggggtcacaggagctgccccgcgagaagtacctgacttgggcatcccggcaggagcccagccagggcacca
ccaccttcgctgtgaccagcatactgcgcgtggcagccgaggactggaagaaggggacaccttctccgcatggtgggccacg
aggccctgccgctggccttcacacagaagaccatcgaccgcttggcgggtaaacccacccatgtcaatgtgtctgttgtcatggcg
gaggtggactgataatctaga

Amino acid sequence:

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQPVPSTPPT
PSPSTPPTPSPSCCHPRLSLHRPALEDLLLGSEAILTCTLTGLRDASGVTFTWTPSSG
KSAVQGPPDRDLCGCYSVSSVLPGCAEPWNHGKTFTCTAAYPESKTPLTATLSKS
GNTFRPEVHLLPPPSEELALNELVTLTCLARGFSPKDVLVRWLQGSQELPREKYLT
WASRQEPSQGTTTFAVTSILRVAAEDWKKGDTFSCMVGHEALPLAFTQKTIDRLA
GKPTHVNVSVVMAEVD

**18. 2H7 scFv VH L11S mIgA WH WCH2 T4 CH3**

Nucleotide sequence:

aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtctgtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggct

acacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaatg
gtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcagc
agcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcaca
gggaccacggtcaccgtctcttctgatcacatctgttctcctcctactactcctcctccaccttcctgccagcccagcctgtcactgca
gcggccagctcttgaggacctgctcctgggttcagatgccagcatcacatgtactctgaatggcctgagagatcctgagggagctg
tcttcacctgggagccctccactgggaaggatgcagtgcagaagaaagctgtgcagaattcctgcggctgctacagtgtgtccagc
gtcctgcctggctgtgctgagcgctggaacagtggcgcatcattcaagtgcacagttacccatcctgagtctgacaccttaactggc
acaattgccaaagtcacagtgaacaccttcccaccccaggtccacctgctaccgccgccgtcggaggagctggccctgaatgag
ctcgtgtccctgacatgcctggtgcgagctttcaaccctaaagaagtgctggtgcgatggctgcatggaaatgaggagctgtcccc
agaaagctacctagtgtttgagcccctaaaggagccaggcgagggagccaccacctacctggtgacaagcgtgttgcgtgtatca
gctgaaatctggaaacagggtgaccagtactcctgcatggtgggccacgaggccttgcccatgaacttcacccagaagaccatcg
accgtctgtcgggtaaacccaccaatgtcagcgtgtctgtgatcatgtcagagggagattgataatctagat

Amino acid sequence:
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDHICSPPTTP
PPPSCQPSLSLQRPALEDLLLGSDASITCTLNGLRDPEGAVFTWEPSTGKDAVQKK
AVQNSCGCYSVSSVLPGCAERWNSGASFKCTVTHPESDTLTGTIAKVTVNTFPPQV
HLLPPPSEELALNELVSLTCLVRAFNPKEVLVRWLHGNEELSPESYLVFEPLKEPGE
GATTYLVTSVLRVSAEIWKQGDQYSCMVGHEALPMNFTQKTIDRLSGKPTNVSVS
VIMSEGD

**A. mIgA WCH2 T4CH3**

Nucleotide sequence:
Gttgttgatcacatctgttctcctcctactactcctcctccaccttcctgccagcccagcctgtcactgcagcggccagctcttgagga
cctgctcctgggttcagatgccagcatcacatgtactctgaatggcctgagagatcctgagggagctgtcttcacctgggagccctc
cactgggaaggatgcagtgcagaagaaagctgtgcagaattcctgcggctgctacagtgtgtccagcgtcctgcctggctgtgctg
agcgctggaacagtggcgcatcattcaagtgcacagttacccatcctgagtctgacaccttaactggcacaattgccaaagtcaca
gtgaacaccttcccaccccaggtccacctgctaccgccgccgtcggaggagctggccctgaatgagctcgtgtccctgacatgcc
tggtgcgagctttcaaccctaaagaagtgctggtgcgatggctgcatggaaatgaggagctgtccccagaaagctacctagtgtttg
agccctaaaggagccaggcgagggagccaccacctacctggtgacaagcgtgttgcgtgtatcagctgaaatctggaaacagg
gtgaccagtactcctgcatggtgggccacgaggccttgcccatgaacttcacccagaagaccatcgaccgtctgtcgggtaaacc
caccaatgtcagcgtgtctgtgatcatgtcagagggagattgataatctagat

Amino acid sequence:
DHICSPPTTPPPPSCQPSLSLQRPALEDLLLGSDASITCTLNGLRDPEGAVFTWEPST
GKDAVQKKAVQNSCGCYSVSSVLPGCAERWNSGASFKCTVTHPESDTLTGTIAKV
TVNTFPPQVHLLPPPSEELALNELVSLTCLVRAFNPKEVLVRWLHGNEELSPESYL
VFEPLKEPGEGATTYLVTSVLRVSAEIWKQGDQYSCMVGHEALPMNFTQKTIDRL
SGKPTNVSVSVIMSEGD

**20. K322S CH2 region**
Nucleotide sequence:
cctgaactcctgggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggacccctgaggtcac
atgcgtggtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaa
gacaaagccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatg
gcaaggagtacaagtgctcggtctccaacaaagccctcccagcccccatcgagaaaacaatctccaaagccaaa

Amino acid sequence:
PELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCSVSNKALPAPIEKTISKAK

**21. K322S CH2 WCH3**

Nucleotide sequence:
cctgaactcctgggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggacccctgaggtcac
atgcgtggtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaa
gacaaagccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatg
gcaaggagtacaagtgctcggtctccaacaaagccctcccagcccccatcgagaaaacaatctccaaagccaaagggcagccc
cgagaaccacaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaagg
cttctatcccagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctgg
actccgacggctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtg
atgcatgaggctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:
PELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCSVSNKALPAPIEKTISKAKG
QPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPV
LDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

**1. K322L CH2 WCH3**

Nucleotide sequence:
tgatcaggagcccaaatcttctgacaaaactcacacatcccccaccgtcctcagcacctgaactcctgggggaccgtcagtcttcct
cttccccccaaaacccaaggacaccctcatgatctcccggacccctgaggtcacatgcgtggtggtggacgtgagccacgaaga
ccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagccgcgggaggagcagtacaaca
gcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggagtacaagtgcctggtctccaacaa
agccctcccagcccccatcgagaaaacaatctccaaagccaaagggcagccccgagaaccacaggtgtacaccctgcccccat
cccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatcccagcgacatcgccgtggagtggg
agagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacggctccttcttcctctacagcaagct
caccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgaggctctgcacaaccactacacgca
gaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:
DQEPKSSDKTHTSPPSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHED
PEVKFNWYVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCLV
SNKALPAPIEKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVE
WESNGQPENNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHN
HYTQKSLSLSPGK

**22. 2H7 scFv VHL11S hIgG1 (SSS-S)H K322SCH2 WCH3**

**Nucleotide sequence:**
aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctcccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtcggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag

cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttctgacaaaactcacacatccccaccgtcctcagcacctgaact
cctgggggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggaccccctgaggtcacatgcgtgg
tggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagc
cgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggag
tacaagtgctcggtctccaacaaagccctcccagccccatcgagaaaacaatctccaaagccaaagggcagccccgagaacca
caggtgtacaccctgccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatccca
gcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacgg
ctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgagg
ctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

**Amino acid sequence:**

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSSDK
THTSPPSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCSVSNKALPAPIE
KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLS
PGK

**23. 2H7 scFv VHL11S hIgG1 (SSS-S)H K322LCH2 WCH3**

Nucleotide sequence:

aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtcggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttctgacaaaactcacacatccccaccgtcctcagcacctgaact
cctgggggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggaccccctgaggtcacatgcgtgg
tggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagc
cgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggag
tacaagtgcctggtctccaacaaagccctcccagccccatcgagaaaacaatctccaaagccaaagggcagccccgagaacca
caggtgtacaccctgccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatccca
gcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacgg
ctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgagg
ctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSSDK

THTSPPSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCLVSNKALPAPIE
KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLS
PGK

**24. 2H7 scFv VHL11S hIgG1 (CSS-S)H K322SCH2 WCH3**

Nucleotide sequence:

aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtcggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttgtgacaaaactcacacatccccaccgtcctcagcacctgaact
cctgggggggaccgtcagtcttcctcttccccccaaaacccaaggacaccctcatgatctcccggaccccctgaggtcacatgcgtgg
tggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagc
cgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggag
tacaagtgctcggtctccaacaaagccctcccagcccccatcgagaaaacaatctccaaagccaaagggcagccccgagaacca
caggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatccca
gcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacgg
ctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgagg
ctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSCDK
THTSPPSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCSVSNKALPAPIE
KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLS
PGK

**25. P331S CH2**

Nucleotide sequence:

cctgaactcctgggggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggaccccctgaggtcac
atgcgtggtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaa
gacaaagccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatg
gcaaggagtacaagtgcaaggtctccaacaaagccctcccagcctccatcgagaaaacaatctccaaagccaaa

Amino acid sequence

PELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPASIEKTISKAK

**26. P331S CH2 WCH3**

Nucleotide sequence:
cctgaactcctgggggaccgtcagtcttcctcttccccccaaaacccaaggacaccctcatgatctcccggaccccctgaggtcac
atgcgtggtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaa
gacaaagccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatg
gcaaggagtacaagtgcaaggtctccaacaaagccctcccagcctccatcgagaaaacaatctccaaagccaaagggcagccc
cgagaaccacaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaagg
cttctatcccagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctgg
actccgacggctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtg
atgcatgaggctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence
PELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPASIEKTISKAKG
QPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPV
LDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

**27. 2H7 scFv VH L11S (SSS-S)H P331S CH2 WCH3**

Nucleotide sequence:
aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtcggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaaiggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttctgacaaaactcacacatcccccaccgtcctcagcacctgaact
cctgggggaccgtcagtcttcctcttccccccaaaacccaaggacaccctcatgatctcccggaccccctgaggtcacatgcgtgg
tggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagc
cgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggag
tacaagtgcaaggtctccaacaaagccctcccagcctccatcgagaaaacaatctccaaagccaaagggcagccccgagaacca
caggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatccca
gcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacgg
ctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgagg
ctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSSDK
THTSPPSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPASIE
KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLS
PGK

**28. 2H7 scFv VH L11S (CSS-S)H P331S CH2 WCH3**

Nucleotide sequence:
aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctcccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtcggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttgtgacaaaactcacacatccccaccgtcctcagcacctgaact
cctgggggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggacccctgaggtcacatgcgtgg
tggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagc
cgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggag
tacaagtgcaaggtctccaacaaagccctcccagcctccatcgagaaaacaatctccaaagccaaagggcagccccgagaacca
caggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatccca
gcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacgg
ctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgagg
ctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSCDK
THTSPPSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPASIE
KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLS
PGK

**29. T256N CH2 region**
Nucleotide sequence:
Cctgaactcctgggggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggaaccctgaggtca
catgcgtggtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgcca
agacaaagccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaat
ggcaaggagtacaagtgcaaggtctccaacaaagccctcccagcccccatcgagaaaacaatctccaaagccaaa

Amino acid sequence
PELLGGPSVFLFPPKPKDTLMISRNPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAK

30. **T256N CH2 WCH3**
Nucleotide sequence:
cctgaactcctgggggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggaaccctgaggtcac
atgcgtggtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaa
gacaaagccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatg
gcaaggagtacaagtgcaaggtctccaacaaagccctcccagcccccatcgagaaaacaatctccaaagccaaagggcagccc
cgagaaccacaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaagg
cttctatcccagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctgg

actccgacggctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtg
atgcatgaggctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence
PELLGGPSVFLFPPKPKDTLMISRNPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKG
QPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPV
LDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

**31. 2H7 scFv VH L11S (SSS-S)H T256N CH2 WCH3**

Nucleotide sequence:
aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtcggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttctgacaaaactcacacatccccaccgtcctcagcacctgaact
cctgggggggaccgtcagtcttcctcttccccccaaaacccaaggacaccctcatgatctcccggaaccctgaggtcacatgcgtgg
tggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagc
cgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggag
tacaagtgcaaggtctccaacaaagccctcccagccccccatcgagaaaacaatctccaaagccaaagggcagccccgagaacc
acaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatccc
agcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacg
gctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgag
gctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSSDK
THTSPPSSAPELLGGPSVFLFPPKPKDTLMISRNPEVTCVVVDVSHEDPEVKFNWY
VDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
NNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSL
SPGK

**32. 2H7 scFv VH L11S (CSS-S)H T256N CH2 WCH3**

Nucleotide sequence:
aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg

ggagctctcaggcttatctacagcagtctggggctgagtcggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttgtgacaaaactcacacatcccccaccgtcctcagcacctgaact
cctgggggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggaaccctgaggtcacatgcgtgg
tggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagc
cgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggag
tacaagtgcaaggtctccaacaaagccctcccagcccccatcgagaaaacaatctccaaagccaaagggcagccccgagaacc
acaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatccc
agcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacg
gctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgag
gctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSCDK
THTSPPSSAPELLGGPSVFLFPPKPKDTLMISRNPEVTCVVVDVSHEDPEVKFNWY
VDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
NNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSL
SPGK

**33. RTPE/QNAK (255-258) CH2**

Nucleotide sequence:
cctgaactcctgggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccagaacgctaaggtcac
atgcgtggtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaa
gacaaagccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatg
gcaaggagtacaagtgcaaggtctccaacaaagccctcccagcccccatcgagaaaacaatctccaaagccaaa

Amino acid sequence
PELLGGPSVFLFPPKPKDTLMISQNAKVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAK

**34. RTPE/QNAK (255-258)CH2 WCH3**

Nucleotide sequence:
cctgaactcctgggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccagaacgctaaggtcac
atgcgtggtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaa
gacaaagccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatg
gcaaggagtacaagtgcaaggtctccaacaaagccctcccagcccccatcgagaaaacaatctccaaagccaaagggcagccc
cgagaaccacaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaagg
cttctatcccagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctgg
actccgacggctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtg
atgcatgaggctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence
PELLGGPSVFLFPPKPKDTLMISQNAKVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKG

QPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPV
LDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

**35. 2H7 scFv VH L11S (SSS-S)H RTPE/QNAK (255-258)CH2 WCH3**

Nucleotide sequence:

aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctcccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtcggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttctgacaaaactcacacatcccccaccgtcctcagcacctgaact
cctgggggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccagaacgctaaggtcacatgcgtgg
tggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagc
cgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggag
tacaagtgcaaggtctccaacaaagccctcccagcccccatcgagaaaacaatctccaaagccaaagggcagccccgagaacc
acaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatccc
agcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacg
gctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgag
gctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSSDK
THTSPPSSAPELLGGPSVFLFPPKPKDTLMISQNAKVTCVVVDVSHEDPEVKFNWY
VDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
NNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSL
SPGK

**36. 2H7 scFv VH L11S (CSS-S)H RTPE/QNAK (255-258)CH2 WCH3**

Nucleotide sequence:

aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctcccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtcggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttgtgacaaaactcacacatcccccaccgtcctcagcacctgaact
cctgggggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccagaacgctaaggtcacatgcgtgg
tggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagc

cgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggag
tacaagtgcaaggtctccaacaaagccctcccagccccatcgagaaaacaatctccaaagccaaagggcagccccgagaacc
acaggtgtacaccctgccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatccc
agcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacg
gctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgag
gctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSCDK
THTSPPSSAPELLGGPSVFLFPPKPKDTLMISQNAKVTCVVVDVSHEDPEVKFNWY
VDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
NNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSL
SPGK

**36. K290Q CH2 region**

Nucleotide sequence:
cctgaactcctgggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggacccctgaggtcac
atgcgtggtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaa
gacacagccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatg
gcaaggagtacaagtgcaaggtctccaacaaagccctcccagccccatcgagaaaacaatctccaaagccaaa

Amino acid sequence:
PELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTQPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAK

**37. K290Q CH2 WCH3**

Nucleotide sequence:
Cctgaactcctgggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggacccctgaggtca
catgcgtggtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgcca
agacacagccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaat
ggcaaggagtacaagtgcaaggtctccaacaaagccctcccagccccatcgagaaaacaatctccaaagccaaagggcagcc
ccgagaaccacaggtgtacaccctgccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaag
gcttctatcccagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctg
gactccgacggctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgt
gatgcatgaggctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:
PELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTQPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKG
QPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPV
LDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

**38. 2H7 scFv VH L11S (SSS-S)H K290Q CH2 WCH3**

Nucleotide sequence:
aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact

ggtaccagcagaagccaggatcctcccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtcggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttctgacaaaactcacacatccccaccgtcctcagcacctgaact
cctgggggacccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggaccccctgaggtcacatgcgtgg
tggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacacagc
cgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggag
tacaagtgcaaggtctccaacaaagccctcccagcccccatcgagaaaacaatctccaaagccaaagggcagccccgagaacc
acaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatccc
agcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacg
gctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgag
gctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSSDK
THTSPPSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVEVHNAKTQPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLS
PGK

**39. 2H7 scfv VH L11S (CSS-S)H K290Q CH2 WCH3**

Nucleotide sequence:
aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctcccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtcggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttgtgacaaaactcacacatccccaccgtcctcagcacctgaact
cctgggggacccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggaccccctgaggtcacatgcgtgg
tggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacacagc
cgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggag
tacaagtgcaaggtctccaacaaagccctcccagcccccatcgagaaaacaatctccaaagccaaagggcagccccgagaacc
acaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatccc
agcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacg
gctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgag
gctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSCDK
THTSPPSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVEVHNAKTQPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLS
PGK

**40. A339PCH2**

Nucleotide sequence:

cctgaactcctgggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggacccctgaggtcac
atgcgtggtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaa
gacaaagccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatg
gcaaggagtacaagtgcaaggtctccaacaaagccctcccagcccccatcgagaaaacaatctccaaacccaaa

Amino acid sequence:

PELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKPK

**41. A339P CH2 WCH3**

Nucleotide sequence:

cctgaactcctgggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggacccctgaggtcac
atgcgtggtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaa
gacaaagccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatg
gcaaggagtacaagtgcaaggtctccaacaaagccctcccagcccccatcgagaaaacaatctccaaacccaaagggcagccc
cgagaaccacaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaagg
cttctatcccagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctgg
actccgacggctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtg
atgcatgaggctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:

PELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKPKG
QPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPV
LDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

**42. 2H7 scFv VHL11S (SSS-S)H A339P CH2 WCH3**

Nucleotide sequence:

aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtcggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac

agggaccacggtcaccgtctcttctgatcaggagcccaaatcttctgacaaaactcacacatccccaccgtcctcagcacctgaact
cctgggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggaccccctgaggtcacatgcgtgg
tggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagc
cgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggag
tacaagtgcaaggtctccaacaaagccctcccagccccatcgagaaaacaatctccaaacccaaagggcagccccgagaacc
acaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatccc
agcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacg
gctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgag
gctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSSDK
THTSPPSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKPKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLS
PGK

**43. 2H7 scFv VHL11S (CSS-S)H A339P CH2 WCH3**

Nucleotide sequence:
aagcttgccgccatggatttttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtcggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttgtgacaaaactcacacatccccaccgtcctcagcacctgaact
cctgggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggaccccctgaggtcacatgcgtgg
tggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagc
cgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggag
tacaagtgcaaggtctccaacaaagccctcccagccccatcgagaaaacaatctccaaacccaaagggcagccccgagaacc
acaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatccc
agcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacg
gctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgag
gctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSCDK
THTSPPSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV

DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKPKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLS
PGK

**44. G28-1VH**

Nucleotide sequence:

gcggtccagctgcagcagtctggacctgagctggaaaagcctggcgcttcagtgaagatttcctgcaaggcttctggttactcattc
actggctacaatatgaactgggtgaagcagaataatggaaagagccttgagtggattggaaatattgatccttattatggtggtacta
cctacaaccggaagttcaagggcaaggccacattgactgtagacaaatcctccagcacagcctacatgcagctcaagagtctgac
atctgaggactctgcagtctattactgtgcaagatcggtcggccctatggactactggggtcaaggaacctcagtcaccgtctcttct
gatcag

Amino acid sequence:

AVQLQQSGPELEKPGASVKISCKASGYSFTGYNMNWVKQNNGKSLEWIGNIDPY
YGGTTYNRKFKGKATLTVDKSSSTAYMQLKSLTSEDSAVYYCARSVGPMDYWG
QGTSVTVSSDQ

**45. G28-1VL**

Nucleotide sequence:

aagcttgccgccatggtatccacagctcagttccttgggttgctgctgctgtggcttacaggtggcagatgtgacatccagatgactc
agtctccagcctccctatctgcatctgtgggagagactgtcaccatcacatgtcgaacaagtgaaaatgtttacagttatttggcttggt
atcagcagaaacagggaaaatctcctcagctcctggtctctttgcaaaaaccttagcagaaggtgtgccatcaaggttcagtggca
gtggatcaggcacacagttttctctgaagatcagcagcctgcagcctgaagattctggaagttatttctgtcaacatcattccgataat
ccgtggacgttcggtggaggcaccgaactggagatcaaaggtggcggtggctcgggcggtggtgggtcgggtggcggcggat
cgtca

Amino acid sequence:

MVSTAQFLGLLLLWLTGGRCDIQMTQSPASLSASVGETVTITCRTSENVYSYLAW
YQQKQGKSPQLLVSFAKTLAEGVPSRFSGSGSGTQFSLKISSLQPEDSGSYFCQHHS
DNPWTFGGGTELEIKGGGGSGGGGSGGGGSS

**46. G28-1 scFv**

Nucleotide sequence:

aagcttgccgccatggtatccacagctcagttccttgggttgctgctgctgtggcttacaggtggcagatgtgacatccagatgactc
agtctccagcctccctatctgcatctgtgggagagactgtcaccatcacatgtcgaacaagtgaaaatgtttacagttatttggcttggt
atcagcagaaacagggaaaatctcctcagctcctggtctctttgcaaaaaccttagcagaaggtgtgccatcaaggttcagtggca
gtggatcaggcacacagttttctctgaagatcagcagcctgcagcctgaagattctggaagttatttctgtcaacatcattccgataat
ccgtggacgttcggtggaggcaccgaactggagatcaaaggtggcggtggctcgggcggtggtgggtcgggtggcggcggat
cgtcagcggtccagctgcagcagtctggacctgagctggaaaagcctggcgcttcagtgaagatttcctgcaaggcttctggttact
cattcactggctacaatatgaactgggtgaagcagaataatggaaagagccttgagtggattggaaatattgatccttattatggtggt
actacctacaaccggaagttcaagggcaaggccacattgactgtagacaaatcctccagcacagcctacatgcagctcaagagtct
gacatctgaggactctgcagtctattactgtgcaagatcggtcggccctatggactactggggtcaaggaacctcagtcaccgtctc
ttctgatcag

Amino acid sequence:

MVSTAQFLGLLLLWLTGGRCDIQMTQSPASLSASVGETVTITCRTSENVYSYLAW
YQQKQGKSPQLLVSFAKTLAEGVPSRFSGSGSGTQFSLKISSLQPEDSGSYFCQHHS
DNPWTFGGGTELEIKGGGGSGGGGSGGGGSSAVQLQQSGPELEKPGASVKISCKA

SGYSFTGYNMNWVKQNNGKSLEWIGNIDPYYGGTTYNRKFKGKATLTVDKSSST
AYMQLKSLTSEDSAVYYCARSVGPMDYWGQGTSVTVSSDQ

**47. G28-1 VHL11S**

Nucleotide sequence:

gcggtccagctgcagcagtctggacctgagtcggaaaagcctggcgcttcagtgaagatttcctgcaaggcttctggttactcattc
actggctacaatatgaactgggtgaagcagaataatggaaagagccttgagtggattggaaatattgatccttattatggtggtacta
cctacaaccggaagttcaagggcaaggccacattgactgtagacaaatcctccagcacagcctacatgcagctcaagagtctgac
atctgaggactctgcagtctattactgtgcaagatcggtcggccctatggactactggggtcaaggaacctcagtcaccgtctcttct
gatcag

Amino acid sequence:

AVQLQQSGPESEKPGASVKISCKASGYSFTGYNMNWVKQNNGKSLEWIGNIDPYY
GGTTYNRKFKGKATLTVDKSSSTAYMQLKSLTSEDSAVYYCARSVGPMDYWGQ
GTSVTVSSDQ

**48. G28-1 VHL11S scFv**

Nucleotide sequence:

aagcttgccgccatggtatccacagctcagttccttgggttgctgctgctgtggcttacaggtggcagatgtgacatccagatgactc
agtctccagcctccctatctgcatctgtgggagagactgtcaccatcacatgtcgaacaagtgaaaatgtttacagttatttggcttggt
atcagcagaaacagggaaaatctcctcagctcctggtctcttttgcaaaaaccttagcagaaggtgtgccatcaaggttcagtggca
gtggatcaggcacacagttttctctgaagatcagcagcctgcagcctgaagattctggaagttatttctgtcaacatcattccgataat
ccgtggacgttcggtggaggcaccgaactggagatcaaaggtggcggtggctcgggcggtggtgggtcgggtggcggcggat
cgtcagcggtccagctgcagcagtctggacctgagtcggaaaagcctggcgcttcagtgaagatttcctgcaaggcttctggttact
cattcactggctacaatatgaactgggtgaagcagaataatggaaagagccttgagtggattggaaatattgatccttattatggtggt
actacctacaaccggaagttcaagggcaaggccacattgactgtagacaaatcctccagcacagcctacatgcagctcaagagtct
gacatctgaggactctgcagtctattactgtgcaagatcggtcggccctatggactactggggtcaaggaacctcagtcaccgtctc
ttctgatcag

Amino acid sequence:

MVSTAQFLGLLLLWLTGGRCDIQMTQSPASLSASVGETVTITCRTSENVYSYLAW
YQQKQGKSPQLLVSFAKTLAEGVPSRFSGSGSGTQFSLKISSLQPEDSGSYFCQHHS
DNPWTFGGGTELEIKGGGGSGGGGSGGGGSSAVQLQQSGPESEKPGASVKISCKA
SGYSFTGYNMNWVKQNNGKSLEWIGNIDPYYGGTTYNRKFKGKATLTVDKSSST
AYMQLKSLTSEDSAVYYCARSVGPMDYWGQGTSVTVSSDQ

**49. G28-1 scFv (SSS-S)H WCH2 WCH3**

Nucleotide sequence:

aagcttgccgccatggtatccacagctcagttccttgggttgctgctgctgtggcttacaggtggcagatgtgacatccagatgactc
agtctccagcctccctatctgcatctgtgggagagactgtcaccatcacatgtcgaacaagtgaaaatgtttacagttatttggcttggt
atcagcagaaacagggaaaatctcctcagctcctggtctcttttgcaaaaaccttagcagaaggtgtgccatcaaggttcagtggca
gtggatcaggcacacagttttctctgaagatcagcagcctgcagcctgaagattctggaagttatttctgtcaacatcattccgataat
ccgtggacgttcggtggaggcaccgaactggagatcaaaggtggcggtggctcgggcggtggtgggtcgggtggcggcggat
cgtcagcggtccagctgcagcagtctggacctgagctggaaaagcctggcgcttcagtgaagatttcctgcaaggcttctggttact
cattcactggctacaatatgaactgggtgaagcagaataatggaaagagccttgagtggattggaaatattgatccttattatggtggt
actacctacaaccggaagttcaagggcaaggccacattgactgtagacaaatcctccagcacagcctacatgcagctcaagagtct
gacatctgaggactctgcagtctattactgtgcaagatcggtcggccctatggactactggggtcaaggaacctcagtcaccgtctc
ttctgatcatgatcaggagcccaaatcttctgacaaaactcacacatcccccaccgtcctcagcacctgaactcctgggggggaccgtc

agtcttcctcttccccccaaaacccaaggacaccctcatgatctcccggacccctgaggtcacatgcgtggtggtggacgtgagcc
acgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagccgcgggaggagca
gtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggagtacaagtgcaaggtc
tccaacaaagccctcccagccccatcgagaaaacaatctccaaagccaaagggcagccccgagaaccacaggtgtacaccct
gcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatcccagcgacatcgccgtg
gagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacggctccttcttcctctac
agcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgaggctctgcacaaccact
acacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:
MVSTAQFLGLLLLWLTGGRCDIQMTQSPASLSASVGETVTITCRTSENVYSYLAW
YQQKQGKSPQLLVSFAKTLAEGVPSRFSGSGSGTQFSLKISSLQPEDSGSYFCQHHS
DNPWTFGGGTELEIKGGGGSGGGGSGGGGSSAVQLQQSGPELEKPGASVKISCKA
SGYSFTGYNMNWVKQNNGKSLEWIGNIDPYYGGTTYNRKFKGKATLTVDKSSST
AYMQLKSLTSEDSAVYYCARSVGPMDYWGQGTSVTVSSDHDQEPKSSDKTHTSP
PSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVE
VHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISK
AKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKT
TPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

**50. G28-1 scFv IgAW H IgG1WCH2 WCH3**

Nucleotide sequence:
aagcttgccgccatggtatccacagctcagttccttgggttgctgctgtggcttacaggtggcagatgtgacatccagatgactc
agtctccagcctccctatctgcatctgtgggagagactgtcaccatcacatgtcgaacaagtgaaaatgtttacagttatttggcttggt
atcagcagaaacagggaaaatctcctcagctcctggtctcttttgcaaaaaccttagcagaaggtgtgccatcaaggttcagtggca
gtggatcaggcacacagttttctctgaagatcagcagcctgcagcctgaagattctggaagttatttctgtcaacatcattccgataat
ccgtggacgttcggtggaggcaccgaactggagatcaaaggtggcggtggctcgggcggtggtgggtcgggtggcggcggat
cgtcagcggtccagctgcagcagtctggacctgagctggaaaagcctggcgcttcagtgaagatttcctgcaaggcttctggttact
cattcactggctacaatatgaactgggtgaagcagaataatggaaagagccttgagtggattggaaatattgatccttattatggtggt
actacctacaaccggaagttcaagggcaaggccacattgactgtagacaaatcctccagcacagcctacatgcagctcaagagtct
gacatctgaggactctgcagtctattactgtgcaagatcggtcggccctatggactactggggtcaaggaacctcagtcaccgtctc
ttctgatcagccagttccctcaactccacctaccccatctccctcaactccacctaccccatctccctcatgcgcacctgaactcctgg
ggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggaccccctgaggtcacatgcgtggtggtg
gacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagccgcg
ggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggagtacaa
gtgcaaggtctccaacaaagccctcccagccccatcgagaaaacaatctccaaagccaaagggcagccccgagaaccacagg
tgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatcccagcga
catcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacggctcct
tcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgaggctctg
cacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:
MVSTAQFLGLLLLWLTGGRCDIQMTQSPASLSASVGETVTITCRTSENVYSYLAW
YQQKQGKSPQLLVSFAKTLAEGVPSRFSGSGSGTQFSLKISSLQPEDSGSYFCQHHS
DNPWTFGGGTELEIKGGGGSGGGGSGGGGSSAVQLQQSGPELEKPGASVKISCKA
SGYSFTGYNMNWVKQNNGKSLEWIGNIDPYYGGTTYNRKFKGKATLTVDKSSST
AYMQLKSLTSEDSAVYYCARSVGPMDYWGQGTSVTVSSDQPVPSTPPTPSPSTPPT
PSPSCAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDG
VEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTI
SKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNY

KTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPG
K

51. **G28-1 scFv VHL11S (SSS-S)H WCH2 WCH3**

Nucleotide sequence:

aagcttgccgccatggtatccacagctcagttccttgggttgctgctgctgtggcttacaggtggcagatgtgacatccagatgactc
agtctccagcctccctatctgcatctgtgggagagactgtcaccatcacatgtcgaacaagtgaaaatgtttacagttatttggcttggt
atcagcagaaacagggaaaatctcctcagctcctggtctcttttgcaaaaaccttagcagaaggtgtgccatcaaggttcagtggca
gtggatcaggcacacagttttctctgaagatcagcagcctgcagcctgaagattctggaagttatttctgtcaacatcattccgataat
ccgtggacgttcggtggaggcaccgaactggagatcaaaggtggcggtggctcgggcggtggtgggtcgggtggcggcggat
cgtcagcggtccagctgcagcagtctggacctgagtcggaaaagcctggcgcttcagtgaagatttcctgcaaggcttctggttact
cattcactggctacaatatgaactgggtgaagcagaataatggaaagagccttgagtggattggaaatattgatccttattatggtggt
actacctacaaccggaagttcaagggcaaggccacattgactgtagacaaatcctccagcacagcctacatgcagctcaagagtct
gacatctgaggactctgcagtctattactgtgcaagatcggtcggccctatggactactggggtcaaggaacctcagtcaccgtctc
ttctgatcaggagcccaaatcttctgacaaaactcacacatcccccaccgtcctcagcacctgaactcctgggggggaccgtcagtctt
cctcttcccccaaaacccaaggacaccctcatgatctcccggacccctgaggtcacatgcgtggtggtggacgtgagccacgaa
gaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagccgcgcgggaggagcagtacaa
cagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggagtacaagtgcaaggtctccaac
aaagccctcccagccccatcgagaaaacaatctccaaagccaaagggcagccccgagaaccacaggtgtacaccctgccccc
atcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatcccagcgacatcgccgtggagtgg
gagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacggctccttcttcctctacagcaag
ctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgaggctctgcacaaccactacacgc
agaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:

MVSTAQFLGLLLLWLTGGRCDIQMTQSPASLSASVGETVTITCRTSENVYSYLAW
YQQKQGKSPQLLVSFAKTLAEGVPSRFSGSGSGTQFSLKISSLQPEDSGSYFCQHHS
DNPWTFGGGTELEIKGGGGSGGGGSGGGGSSAVQLQQSGPESEKPGASVKISCKA
SGYSFTGYNMNWVKQNNGKSLEWIGNIDPYYGGTTYNRKFKGKATLTVDKSSST
AYMQLKSLTSEDSAVYYCARSVGPMDYWGQGTSVTVSSDHDQEPKSSDKTHTSP
PSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVE
VHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISK
AKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKT
TPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

52. **G28-1 scFv VHL11S (CSS-S)H WCH2 WCH3**

Nucleotide sequence:

aagcttgccgccatggtatccacagctcagttccttgggttgctgctgctgtggcttacaggtggcagatgtgacatccagatgactc
agtctccagcctccctatctgcatctgtgggagagactgtcaccatcacatgtcgaacaagtgaaaatgtttacagttatttggcttggt
atcagcagaaacagggaaaatctcctcagctcctggtctcttttgcaaaaaccttagcagaaggtgtgccatcaaggttcagtggca
gtggatcaggcacacagttttctctgaagatcagcagcctgcagcctgaagattctggaagttatttctgtcaacatcattccgataat
ccgtggacgttcggtggaggcaccgaactggagatcaaaggtggcggtggctcgggcggtggtgggtcgggtggcggcggat
cgtcagcggtccagctgcagcagtctggacctgagtcggaaaagcctggcgcttcagtgaagatttcctgcaaggcttctggttact
cattcactggctacaatatgaactgggtgaagcagaataatggaaagagccttgagtggattggaaatattgatccttattatggtggt
actacctacaaccggaagttcaagggcaaggccacattgactgtagacaaatcctccagcacagcctacatgcagctcaagagtct
gacatctgaggactctgcagtctattactgtgcaagatcggtcggccctatggactactggggtcaaggaacctcagtcaccgtctc
ttctgatcaggagcccaaatcttgtgacaaaactcacacatcccccaccgtcctcagcacctgaactcctgggggggaccgtcagtctt
cctcttcccccaaaacccaaggacaccctcatgatctcccggacccctgaggtcacatgcgtggtggtggacgtgagccacgaa
gaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagccgcgcgggaggagcagtacaa
cagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggagtacaagtgcaaggtctccaac
aaagccctcccagccccatcgagaaaacaatctccaaagccaaagggcagccccgagaaccacaggtgtacaccctgccccc

atcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatcccagcgacatcgccgtggagtgg
gagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacggctccttcttcctctacagcaag
ctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgaggctctgcacaaccactacacgc
agaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:
MVSTAQFLGLLLLWLTGGRCDIQMTQSPASLSASVGETVTITCRTSENVYSYLAW
YQQKQGKSPQLLVSFAKTLAEGVPSRFSGSGSGTQFSLKISSLQPEDSGSYFCQHHS
DNPWTFGGGTELEIKGGGGSGGGGSGGGGSSAVQLQQSGPESEKPGASVKISCKA
SGYSFTGYNMNWVKQNNGKSLEWIGNIDPYYGGTTYNRKFKGKATLTVDKSSST
AYMQLKSLTSEDSAVYYCARSVGPMDYWGQGTSVTVSSDQEPKSCDKTHTSPPSS
APELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVH
NAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAK
GQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPP
VLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

**53. G28-1 scFv VH L11S (CSC-S)H WCH2 WCH3**

Nucleotide sequence:
aagcttgccgccatggtatccacagctcagttccttgggttgctgctgctgtggcttacaggtggcagatgtgacatccagatgactc
agtctccagcctccctatctgcatctgtgggagagactgtcaccatcacatgtcgaacaagtgaaaatgtttacagttatttggcttggt
atcagcagaaacagggaaaatctcctcagctcctggtctcttttgcaaaaaccttagcagaaggtgtgccatcaaggttcagtggca
gtggatcaggcacacagttttctctgaagatcagcagcctgcagcctgaagattctggaagttatttctgtcaacatcattccgataat
ccgtggacgttcggtggaggcaccgaactggagatcaaaggtggcggtggctcgggcggtggtgggtcgggtggcggcggat
cgtcagcggtccagctgcagcagtctggacctgagtcggaaaagcctggcgcttcagtgaagatttcctgcaaggcttctggttact
cattcactggctacaatatgaactgggtgaagcagaataatggaaagagccttgagtggattggaaatattgatccttattatggtggt
actacctacaaccggaagttcaagggcaaggccacattgactgtagacaaatcctccagcacagcctacatgcagctcaagagtct
gacatctgaggactctgcagtctattactgtgcaagatcggtcggccctatggactactggggtcaaggaacctcagtcaccgtctc
ttctgatcaggagcccaaatcttgtgacaaaactcacacatctccaccgtgctcagcacctgaactcctgggtggaccgtcagtcttc
ctcttccccccaaaacccaaggacaccctcatgatctcccggaccccctgaggtcacatgcgtggtggtggacgtgagccacgaag
accctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagccgcgggaggagcagtacaac
agcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggagtacaagtgcaaggtctccaaca
aagccctcccagcccccatcgagaaaacaatctccaaagccaaagggcagccccgagaaccacaggtgtacaccctgcccccca
tcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatccaagcgacatcgccgtggagtgg
gagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacggctccttcttcctctacagcaag
ctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgaggctctgcacaaccactacacgc
agaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:
MVSTAQFLGLLLLWLTGGRCDIQMTQSPASLSASVGETVTITCRTSENVYSYLAW
YQQKQGKSPQLLVSFAKTLAEGVPSRFSGSGSGTQFSLKISSLQPEDSGSYFCQHHS
DNPWTFGGGTELEIKGGGGSGGGGSGGGGSSAVQLQQSGPESEKPGASVKISCKA
SGYSFTGYNMNWVKQNNGKSLEWIGNIDPYYGGTTYNRKFKGKATLTVDKSSST
AYMQLKSLTSEDSAVYYCARSVGPMDYWGQGTSVTVSSDQEPKSCDKTHTSPPC
SAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEV
HNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKA
KGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTP
PVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

**54. G28-1 scFv VH L11S (SSC-P)H WCH2 WCH3**

Nucleotide sequence:

aagcttgccgccatggtatccacagctcagttccttgggttgctgctgctgtggcttacaggtggcagatgtgacatccagatgactc
agtctccagcctccctatctgcatctgtgggagagactgtcaccatcacatgtcgaacaagtgaaaatgtttacagttatttggcttggt
atcagcagaaacagggaaaatctcctcagctcctggtctcttttgcaaaaaccttagcagaaggtgtgccatcaaggttcagtggca
gtggatcaggcacacagttttctctgaagatcagcagcctgcagcctgaagattctggaagttatttctgtcaacatcattccgataat
ccgtggacgttcggtggaggcaccgaactggagatcaaaggtggcggtggctcgggcggtggtgggtcgggtggcggcggat
cgtcagcggtccagctgcagcagtctggacctgagtcggaaaagcctggcgcttcagtgaagatttcctgcaaggcttctggttact
cattcactggctacaatatgaactgggtgaagcagaataatggaaagagccttgagtggattggaaatattgatccttattatggtggt
actacctacaaccggaagttcaagggcaaggccacattgactgtagacaaatcctccagcacagcctacatgcagctcaagagtct
gacatctgaggactctgcagtctattactgtgcaagatcggtcggccctatggactactggggtcaaggaacctcagtcaccgtctc
ttctgatcaggagcccaaatcttctgacaaaactcacacatcccccaccgtgcccagcacctgaactcctgggggggaccgtcagtctt
cctcttcccccaaaacccaaggacaccctcatgatctcccggaccccctgaggtcacatgcgtggtggtggacgtgagccacgaa
gaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagccgcgggaggagcagtacaa
cagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggagtacaagtgcaaggtctccaac
aaagccctcccagcccccatcgagaaaacaatctccaaagccaaagggcagccccgagaaccacaggtgtacaccctgcccccc
atcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatcccagcgacatcgccgtggagtgg
gagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacggctccttcttcctctacagcaag
ctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgaggctctgcacaaccactacacgc
agaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:
MVSTAQFLGLLLLWLTGGRCDIQMTQSPASLSASVGETVTITCRTSENVYSYLAW
YQQKQGKSPQLLVSFAKTLAEGVPSRFSGSGSGTQFSLKISSLQPEDSGSYFCQHHS
DNPWTFGGGTELEIKGGGGSGGGGSGGGGSSAVQLQQSGPESEKPGASVKISCKA
SGYSFTGYNMNWVKQNNGKSLEWIGNIDPYYGGTTYNRKFKGKATLTVDKSSST
AYMQLKSLTSEDSAVYYCARSVGPMDYWGQGTSVTVSSDQEPKSSDKTHTSPPCP
APELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVH
NAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAK
GQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPP
VLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

## II. 54. HCTLA4 HIGG1 (SSS-S)H P238SCH2 WCH3

Nucleotide sequence:
atggcttgccttggatttcagcggcacaaggctcagctgaacctggctgccaggacctggccctgcactctcctgttttttcttctcttc
atccctgtcttctgcaaagcaatgcacgtggcccagcctgctgtggtactggccagcagccgaggcatcgccagctttgtgtgtga
gtatgcatctccaggcaaagccactgaggtccgggtgacagtgcttcggcaggctgacagccaggtgactgaagtctgtgcggc
aacctacatgacggggaatgagttgaccttcctagatgattccatctgcacgggcacctccagtggaaatcaagtgaacctcactat
ccaaggactgagggccatggacacgggactctacatctgcaaggtggagctcatgtacccaccgccatactacctgggcatagg
caacggaacccagatttatgtaattgatccagaaccgtgcccagattctgatcaacccaaatcttctgacaaaactcacacatcccca
ccgtcctcagcacctgaactcctgggggggatcgtcagtcttcctcttccccccaaaacccaaggacaccctcatgatctcccggac
ccctgaggtcacatgcgtggtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggt
gcataatgccaagacaaagccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccagg
actggctgaatggcaaggagtacaagtgcaaggtctccaacaaagccctcccagccccatcgagaaaacaatctccaaagcca
aagggcagccccgagaaccacaggtgtacaccctgccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgc
ctggtcaaaggcttctatcccagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcc
tcccgtgctggactccgacggctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttct
catgctccgtgatgcatgaggctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatga

Amino acid sequence:
MACLGFQRHKAQLNLAARTWPCTLLFFLLFIPVFCKAMHVAQPAVVLASSRGIAS
FVCEYASPGKATEVRVTVLRQADSQVTEVCAATYMTGNELTFLDDSICTGTSSGN

QVNLTIQGLRAMDTGLYICKVELMYPPPYYLGIGNGTQIYVIDPEPCPDSDQPKSSD
KTHTSPPSSAPELLGGSSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWY
VDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
NNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSL
SPGK

**55. Fc2-2 VL**

Nucleotide sequence:

gttgttaagcttgccgccatggattcacaggcccaggttcttatgttactgctgctatgggtatctggtacctgtggggacattgtgatg
tcacagtctccatcctccctagctgtgtcagttggagagaaggtttctatgagctgcaagtccagtcagagccttttatataatcacaat
caaaagaactacttggcctggtaccagcagataccagggcagtctcctaaactgctgatttactgggcatccactagggaatctgg
ggtccctgatcgcttcacaggcagtggatctgggacagatttcactctcaccatcagcagagtgaaggctgaagacctggcagttta
ttactgtcagcaatattatacctatcctcccacgttcggaggtggcaccaagctggaaataaaaggtggcggtggctcgggcggtg
gtgggtcgggtggcggcgggagctcg

Amino acid sequence:

MDSQAQVLMLLLLWVSGTCGDIVMSQSPSSLAVSVGEKVSMSCKSSQSLLYNHN
QKNYLAWYQQIPGQSPKLLIYWASTRESGVPDRFTGSGSGTDFTLTISRVKAEDLA
VYYCQQYYTYPPTFGGGTKLEIKGGGGSGGGGSGGGGSS

**56. FC2-2VH**

Nucleotide sequence:

Gggagctcgcaggtgcagttgaaggagtcaggacctggcctggtggcgccctcacagagcctgtccatcacatgcaccgtctca
gggttctcattaccgtctatggtgttaactgggttcgccagcctccaggaaagggtctggactggctgggaatgatatggggtgat
ggaagcacagactataattcagctctcaaatccagactgagcatcagtaaggacaactccaagagccaagttttcttaaaaatggac
agtctacaaactgatgacacagccaggtactactgtgccagagatcactatggtacccactatgctatggactactggggtcaagga
acctcagtcaccgtctcctctgatcag

Amino acid sequence:

GSSQVQLKESGPGLVAPSQSLSITCTVSGFSLTVYGVNWVRQPPGKGLDWLGMIW
GDGSTDYNSALKSRLSISKDNSKSQVFLKMDSLQTDDTARYYCARDHYGTHYAM
DYWGQGTSVTVSSDQ

**57. FC2-2scFv**

Nucleotide sequence:

gttgttaagcttgccgccatggattcacaggcccaggttcttatgttactgctgctatgggtatctggtacctgtggggacattgtgatg
tcacagtctccatcctccctagctgtgtcagttggagagaaggtttctatgagctgcaagtccagtcagagccttttatataatcacaat
caaaagaactacttggcctggtaccagcagataccagggcagtctcctaaactgctgatttactgggcatccactagggaatctgg
ggtccctgatcgcttcacaggcagtggatctgggacagatttcactctcaccatcagcagagtgaaggctgaagacctggcagttta
ttactgtcagcaatattatacctatcctcccacgttcggaggtggcaccaagctggaaataaaaggtggcggtggctcgggcggtg
gtgggtcgggtggcggcgggagctctcaggtgcagttgaaggagtcaggacctggcctggtggcgccctcacagagcctgtcc
atcacatgcaccgtctcagggttctcattaccgtctatggtgttaactgggttcgccagcctccaggaaagggtctggactggctgg
gaatgatatggggtgatggaagcacagactataattcagctctcaaatccagactgagcatcagtaaggacaactccaagagccaa
gttttcttaaaaatggacagtctacaaactgatgacacagccaggtactactgtgccagagatcactatggtacccactatgctatgg
actactggggtcaaggaacctcagtcaccgtctcctctgatcag

Amino acid sequence:

MDSQAQVLMLLLLWVSGTCGDIVMSQSPSSLAVSVGEKVSMSCKSSQSLLYNHN
QKNYLAWYQQIPGQSPKLLIYWASTRESGVPDRFTGSGSGTDFTLTISRVKAEDLA
VYYCQQYYTYPPTFGGGTKLEIKGGGGSGGGGSGGGGSSQVQLKESGPGLVAPSQ

SLSITCTVSGFSLTVYGVNWVRQPPGKGLDWLGMIWGDGSTDYNSALKSRLSISK
DNSKSQVFLKMDSLQTDDTARYYCARDHYGTHYAMDYWGQGTSVTVSSDQ

**58. FC2-2 VHL11S**

Nucleotide sequence:

gggagctctcaggtgcagttgaaggagtcaggacctggctcggtggcgccctcacagagcctgtccatcacatgcaccgtctcag
ggttctcattaaccgtctatggtgttaactgggttcgccagcctccaggaaagggtctggactggctgggaatgatatggggtgatg
gaagcacagactataattcagctctcaaatccagactgagcatcagtaaggacaactccaagagccaagttttcttaaaaatggaca
gtctacaaactgatgacacagccaggtactactgtgccagagatcactatggtacccactatgctatggactactggggtcaaggaa
cctcagtcaccgtctcctctgatcag

Amino acid sequence:

(GSS)QVQLKESGPGSVAPSQSLSITCTVSGFSLTVYGVNWVRQPPGKGLDWLGMI
WGDGSTDYNSALKSRLSISKDNSKSQVFLKMDSLQTDDTARYYCARDHYGTHYA
MDYWGQGTSVTVSSDQ

**59. FC2-2 VH L11S scFv**

Nucleotide sequence:

gttgttaagcttgccgccatggattcacaggcccaggttcttatgttactgctgctatgggtatctggtacctgtggggacattgtgatg
tcacagtctccatcctccctagctgtgtcagttggagagaaggtttctatgagctgcaagtccagtcagagccttttatataatcacaat
caaaagaactacttggcctggtaccagcagataccagggcagtctcctaaactgctgatttactgggcatccactagggaatctgg
ggtccctgatcgcttcacaggcagtggatctgggacagatttcactctcaccatcagcagagtgaaggctgaagacctggcagttta
ttactgtcagcaatattatacctatcctcccacgttcggaggtggcaccaagctggaaataaaaggtggcggtggctcgggcggtg
gtgggtcgggtggcggcgggagctctcaggtgcagttgaaggagtcaggacctggctcggtggcgccctcacagagcctgtcc
atcacatgcaccgtctcagggttctcattaaccgtctatggtgttaactgggttcgccagcctccaggaaagggtctggactggctgg
gaatgatatggggtgatggaagcacagactataattcagctctcaaatccagactgagcatcagtaaggacaactccaagagccaa
gttttcttaaaaatggacagtctacaaactgatgacacagccaggtactactgtgccagagatcactatggtacccactatgctatgg
actactggggtcaaggaacctcagtcaccgtctcctctgatcag

Amino acid sequence:

MDSQAQVLMLLLLWVSGTCGDIVMSQSPSSLAVSVGEKVSMSCKSSQSLLYNHN
QKNYLAWYQQIPGQSPKLLIYWASTRESGVPDRFTGSGSGTDFTLTISRVKAEDLA
VYYCQQYYTYPPTFGGGTKLEIKGGGGSGGGGSGGGGSSQVQLKESGPGSVAPSQ
SLSITCTVSGFSLTVYGVNWVRQPPGKGLDWLGMIWGDGSTDYNSALKSRLSISK
DNSKSQVFLKMDSLQTDDTARYYCARDHYGTHYAMDYWGQGTSVTVSSDQ

**60. FC2-2 (SSS-S)H WCH2 WCH3**

Nucleotide sequence:

gttgttaagcttgccgccatggattcacaggcccaggttcttatgttactgctgctatgggtatctggtacctgtggggacattgtgatg
tcacagtctccatcctccctagctgtgtcagttggagagaaggtttctatgagctgcaagtccagtcagagccttttatataatcacaat
caaaagaactacttggcctggtaccagcagataccagggcagtctcctaaactgctgatttactgggcatccactagggaatctgg
ggtccctgatcgcttcacaggcagtggatctgggacagatttcactctcaccatcagcagagtgaaggctgaagacctggcagttta
ttactgtcagcaatattatacctatcctcccacgttcggaggtggcaccaagctggaaataaaaggtggcggtggctcgggcggtg
gtgggtcgggtggcggcgggagctctcaggtgcagttgaaggagtcaggacctggcctggtggcgccctcacagagcctgtcc
atcacatgcaccgtctcagggttctcattaaccgtctatggtgttaactgggttcgccagcctccaggaaagggtctggactggctgg
gaatgatatggggtgatggaagcacagactataattcagctctcaaatccagactgagcatcagtaaggacaactccaagagccaa
gttttcttaaaaatggacagtctacaaactgatgacacagccaggtactactgtgccagagatcactatggtacccactatgctatgg
actactggggtcaaggaacctcagtcaccgtctcctctgatcaggagcccaaatcttctgacaaaactcacacatcccccaccgtcct
cagcacctgaactcctgggtggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggaccccctgag
gtcacatgcgtggtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataat
gccaagacaaagccgcgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggct

gaatggcaaggagtacaagtgcaaggtctccaacaaagccctcccagccccatcgagaaaaccatctccaaagccaaagggc
agccccgagaaccacaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtca
aaggcttctatccaagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtg
ctggactccgacggctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctc
cgtgatgcatgaggctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:
MDSQAQVLMLLLLWVSGTCGDIVMSQSPSSLAVSVGEKVSMSCKSSQSLLYNHN
QKNYLAWYQQIPGQSPKLLIYWASTRESGVPDRFTGSGSGTDFTLTISRVKAEDLA
VYYCQQYYTYPPTFGGGTKLEIKGGGGSGGGGSGGGGSSQVQLKESGPGLVAPSQ
SLSITCTVSGFSLTVYGVNWVRQPPGKGLDWLGMIWGDGSTDYNSALKSRLSISK
DNSKSQVFLKMDSLQTDDTARYYCARDHYGTHYAMDYWGQGTSVTVSSDQEPK
SSDKTHTSPPSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKF
NWYVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKA
LPAPIEKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESN
GQPENNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQ
KSLSLSPGK

**61. FC2-2 VHL11S (SSS-S)H WCH2 WCH3**

Nucleotide sequence:
gttgttaagcttgccgccatggattcacaggcccaggttcttatgttactgctgctatgggtatctggtacctgtggggacattgtgatg
tcacagtctccatcctccctagctgtgtcagttggagagaaggtttctatgagctgcaagtccagtcagagccttttatataatcacaat
caaaagaactacttggcctggtaccagcagataccagggcagtctcctaaactgctgatttactgggcatccactagggaatctgg
ggtccctgatcgcttcacaggcagtggatctgggacagatttcactctcaccatcagcagagtgaaggctgaagacctggcagttta
ttactgtcagcaatattatacctatcctcccacgttcggaggtggcaccaagctggaaataaaaggtggcggtggctcgggcggtg
gtgggtcgggtggcggcgggagctctcaggtgcagttgaaggagtcaggacctggctcggtggcgccctcacagagcctgtcc
atcacatgcaccgtctcagggttctcattaaccgtctatggtgttaactgggttcgccagcctccaggaaagggtctggactggctgg
gaatgatatggggtgatggaagcacagactataattcagctctcaaatccagactgagcatcagtaaggacaactccaagagccaa
gttttcttaaaaatggacagtctacaaactgatgacacagccaggtactactgtgccagagatcactatggtacccactatgctatgg
actactggggtcaaggaacctcagtcaccgtctcctctgatcaggagcccaaatcttctgacaaaactcacacatccccaccgtcct
cagcacctgaactcctgggtggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggacccctgag
gtcacatgcgtggtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataat
gccaagacaaagccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggct
gaatggcaaggagtacaagtgcaaggtctccaacaaagccctcccagccccatcgagaaaaccatctccaaagccaaagggc
agccccgagaaccacaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtca
aaggcttctatccaagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtg
ctggactccgacggctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctc
cgtgatgcatgaggctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:
MDSQAQVLMLLLLWVSGTCGDIVMSQSPSSLAVSVGEKVSMSCKSSQSLLYNHN
QKNYLAWYQQIPGQSPKLLIYWASTRESGVPDRFTGSGSGTDFTLTISRVKAEDLA
VYYCQQYYTYPPTFGGGTKLEIKGGGGSGGGGSGGGGSSQVQLKESGPGSVAPSQ
SLSITCTVSGFSLTVYGVNWVRQPPGKGLDWLGMIWGDGSTDYNSALKSRLSISK
DNSKSQVFLKMDSLQTDDTARYYCARDHYGTHYAMDYWGQGTSVTVSSDQEPK
SSDKTHTSPPSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKF
NWYVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKA
LPAPIEKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESN
GQPENNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQ
KSLSLSPGK

**62. UCHL-1 VH**

Nucleotide sequence:

atgggcaggcttacttcttcattcctgctactgattgttcctgcatatgtcctctcccagattactctgaaagagtctggccctgggatctt
gcagccctcccagaccctcagtctgacttgttctttctctgggttttcactgaccacttatggtataggagtaggttggattcgtcagcct
ccagggaagggtctggagtggctgacacacatttggtggaatgataataagtactataacacagccctgaggagccggctcacaa
tctccaaggattcctccaacaaccaagtactcctcaagatcgccaatgtggacactgcagataccgccacatactactgtctctacg
gctacacttactggggccaagggactctggtcactgtctctgca

Amino acid sequence:

MGRLTSSFLLLIVPAYVLSQITLKESGPGILQPSQTLSLTCSFSGFSLTTYGIGVGWIR
QPPGKGLEWLTHIWWNDNKYYNTALRSRLTISKDSSNNQVLLKIANVDTADTAT
YYCLYGYTYWGQGTLVTVSA

**63. UCHL-1 VL**

Nucleotide sequence:

atgaagttgcctgttaggctgttggtgctgatgttctggattcctgcttccatcagtgatgttgtgatgacccaaactccactctccctgc
ctgtcagtcttggagatcaggcctccatctcttgcagatctagtcagagccttctttacagtaatggaaacacctatttacattggtacct
gcagaagccaggccagtctccaaaactcctgatctacaaactttccaaccgattttctggggtcccagacaggttcagtggcagtgg
atcagggacagatttcacactcaagatcagcagagtggaggctgaggatctgggagtttatttctgctctcaaagtacacatgttccg
tggacgttcggtggaggcaccaagctggaaatcaaa

Amino acid sequence:

MKLPVRLLVLMFWIPASISDVVMTQTPLSLPVSLGDQASISCRSSQSLLYSNGNTYL
HWYLQKPGQSPKLLIYKLSNRFSGVPDRFSGSGSGTDFTLKISRVEAEDLGVYFCS
QSTHVPWTFGGGTKLEIK

**64. UCHL-1 scFv**

Nucleotide sequence:

gttgttaagcttgccgccatgaagttgcctgttaggctgttggtgctgatgttctggattcctgcttccatcagtgatgttgtgatgaccc
aaactccactctccctgcctgtcagtcttggagatcaggcctccatctcttgcagatctagtcagagccttctttacagtaatggaaac
acctatttacattggtacctgcagaagccaggccagtctccaaaactcctgatctacaaactttccaaccgattttctggggtcccaga
caggttcagtggcagtggatcagggacagatttcacactcaagatcagcagagtggaggctgaggatctgggagtttatttctgctc
tcaaagtacacatgttccgtggacgttcggtggaggcaccaagctggaaatcaaagatggcggtggctcgggcggtggtggatct
ggaggaggtgggagctctcagattactctgaaagagtctggccctgggatcttgcagccctcccagaccctcagtctgacttgttctt
tctctgggttttcactgaccacttatggtataggagtaggttggattcgtcagcctccagggaagggtctggagtggctgacacacat
ttggtggaatgataataagtactataacacagccctgaggagccggctcacaatctccaaggattcctccaacaaccaagtactcct
caagatcgccaatgtggacactgcagataccgccacatactactgtctctacggctacacttactggggccaagggactctggtca
ctgtctctgctgatca

Amino acid sequence:

MKLPVRLLVLMFWIPASISDVVMTQTPLSLPVSLGDQASISCRSSQSLLYSNGNTYL
HWYLQKPGQSPKLLIYKLSNRFSGVPDRFSGSGSGTDFTLKISRVEAEDLGVYFCS
QSTHVPWTFGGGTKLEIKDGGGSGGGGSGGGGSSQITLKESGPGILQPSQTLSLTCS
FSGFSLTTYGIGVGWIRQPPGKGLEWLTHIWWNDNKYYNTALRSRLTISKDSSNN
QVLLKIANVDTADTATYYCLYGYTYWGQGTLVTVSAD

65. **UCHL-1 VH I11SL12S**

Nucleotide sequence:

gggagctctcagattactctgaaagagtctggccctgggatcttgcagccctcccagaccctcagtctgacttgttctttctctgggttt
tcactgaccacttatggtataggagtaggttggattcgtcagcctccagggaagggtctggagtggctgacacacatttggtggaat

gataataagtactataacacagccctgaggagccggctcacaatctccaaggattcctccaacaaccaagtactcctcaagatcgc
caatgtggacactgcagataccgccacatactactgtctctacggctacacttactggggccaagggactctggtcactgtctctgct
gatca

Amino acid sequence:
(GSS)QITLKESGPGSSQPSQTLSLTCSFSGFSLTTYGIGVGWIRQPPGKGLEWLTHIW
WNDNKYYNTALRSRLTISKDSSNNQVLLKIANVDTADTATYYCLYGYTYWGQGT
LVTVSAD

**66. UCHL-1 scFv VH L11S**

Nucleotide sequence:
gttgttaagcttgccgccatgaagttgcctgttaggctgttggtgctgatgttctggattcctgcttccatcagtgatgttgtgatgaccc
aaactccactctccctgcctgtcagtcttggagatcaggcctccatctcttgcagatctagtcagagccttctttacagtaatggaaac
acctatttacattggtacctgcagaagccaggccagtctccaaaactcctgatctacaaactttccaaccgattttctggggtcccaga
caggttcagtggcagtggatcagggacagatttcacactcaagatcagcagagtggaggctgaggatctgggagtttatttctgctc
tcaaagtacacatgttccgtggacgttcggtggaggcaccaagctggaaatcaaagatggcggtggctcgggcggtggtggatct
ggaggaggtgggagctctcagattactctgaaagagtctggccctgggagctcccagccctcccagaccctcagtctgacttgttc
tttctctgggttttcactgaccacttatggtataggagtaggttggattcgtcagcctccagggaagggtctggagtggctgacacac
atttggtggaatgataataagtactataacacagccctgaggagccggctcacaatctccaaggattcctccaacaaccaagtactc
ctcaagatcgccaatgtggacactgcagataccgccacatactactgtctctacggctacacttactggggccaagggactctggtc
actgtctctgctgatca

Amino acid sequence:
MKLPVRLLVLMFWIPASISDVVMTQTPLSLPVSLGDQASISCRSSQSLLYSNGNTYL
HWYLQKPGQSPKLLIYKLSNRFSGVPDRFSGSGSGTDFTLKISRVEAEDLGVYFCS
QSTHVPWTFGGGTKLEIKDGGGSGGGGSGGGGSSQITLKESGPGSSQPSQTLSLTC
SFSGFSLTTYGIGVGWIRQPPGKGLEWLTHIWWNDNKYYNTALRSRLTISKDSSNN
QVLLKIANVDTADTATYYCLYGYTYWGQGTLVTVSAD

**67. UCHL-1 scFv (SSS-S)H WCH2 WCH3**

Nucleotide sequence:
gttgttaagcttgccgccatgaagttgcctgttaggctgttggtgctgatgttctggattcctgcttccatcagtgatgttgtgatgaccc
aaactccactctccctgcctgtcagtcttggagatcaggcctccatctcttgcagatctagtcagagccttctttacagtaatggaaac
acctatttacattggtacctgcagaagccaggccagtctccaaaactcctgatctacaaactttccaaccgattttctggggtcccaga
caggttcagtggcagtggatcagggacagatttcacactcaagatcagcagagtggaggctgaggatctgggagtttatttctgctc
tcaaagtacacatgttccgtggacgttcggtggaggcaccaagctggaaatcaaagatggcggtggctcgggcggtggtggatct
ggaggaggtgggagctctcagattactctgaaagagtctggccctgggatcttgcagccctcccagaccctcagtctgacttgttctt
tctctgggttttcactgaccacttatggtataggagtaggttggattcgtcagcctccagggaagggtctggagtggctgacacacat
ttggtggaatgataataagtactataacacagccctgaggagccggctcacaatctccaaggattcctccaacaaccaagtactcct
caagatcgccaatgtggacactgcagataccgccacatactactgtctctacggctacacttactggggccaagggactctggtca
ctgtctctgctgatcaggagcccaaatcttctgacaaaactcacacatcccccaccgtcctcagcacctgaactcctgggtggaccgt
cagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggacccctgaggtcacatgcgtggtggtggacgtgagc
cacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagccgcgggaggagca
gtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggagtacaagtgcaaggtc
tccaacaaagccctcccagcccccatcgagaaaaccatctccaaagccaaagggcagccccgagaaccacaggtgtacaccct
gcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatccaagcgacatcgccgtg
gagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacggctccttcttcctctac
agcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgaggctctgcacaaccact
acacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:
MKLPVRLLVLMFWIPASISDVVMTQTPLSLPVSLGDQASISCRSSQSLLYSNGNTYL
HWYLQKPGQSPKLLIYKLSNRFSGVPDRFSGSGSGTDFTLKISRVEAEDLGVYFCS
QSTHVPWTFGGGTKLEIKDGGGSGGGGSGGGGSSQITLKESGPGILQPSQTLSLTCS
FSGFSLTTYGIGVGWIRQPPGKGLEWLTHIWWNDNKYYNTALRSRLTISKDSSNN
QVLLKIANVDTADTATYYCLYGYTYWGQGTLVTVSADQEPKSSDKTHTSPPSSAP
ELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHNA
KTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKGQ
PREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVL
DSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

**68. UCHL-1 scFv VHL11S (SSS-S)H WCH2 WCH3**

Nucleotide sequence:
gttgttaagcttgccgccatgaagttgcctgttaggctgttggtgctgatgttctggattcctgcttccatcagtgatgttgtgatgaccc
aaactccactctccctgcctgtcagtcttggagatcaggcctccatctcttgcagatctagtcagagccttctttacagtaatggaaac
acctatttacattggtacctgcagaagccaggccagtctccaaaactcctgatctacaaactttccaaccgattttctggggtcccaga
caggttcagtggcagtggatcagggacagatttcacactcaagatcagcagagtggaggctgaggatctgggagtttatttctgctc
tcaaagtacacatgttccgtggacgttcggtggaggcaccaagctggaaatcaaagatggcggtggctcgggcggtggtggatct
ggaggaggtgggagctctcagattactctgaaagagtctggccctgggagctcccagccctcccagaccctcagtctgacttgttc
tttctctgggttttcactgaccacttatggtataggagtaggttggattcgtcagcctccagggaagggtctggagtggctgacacac
atttggtggaatgataataagtactataacacagccctgaggagccggctcacaatctccaaggattcctccaacaaccaagtactc
ctcaagatcgccaatgtggacactgcagataccgccacatactactgtctctacggctacacttactggggccaagggactctggtc
actgtctctgctgatcaggagcccaaatcttctgacaaaactcacacatcccccaccgtcctcagcacctgaactcctgggtggaccg
tcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggacccctgaggtcacatgcgtggtggtggacgtgag
ccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagccgcgggaggagc
agtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggagtacaagtgcaaggt
ctccaacaaagccctcccagcccccatcgagaaaaccatctccaaagccaaagggcagccccgagaaccacaggtgtacaccc
tgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatccaagcgacatcgccgt
ggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacggctccttcttcctcta
cagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgaggctctgcacaacca
ctacacgcagaagagcctctccctgtctccgggtaaatgatctagaa

Amino acid sequence:
MKLPVRLLVLMFWIPASISDVVMTQTPLSLPVSLGDQASISCRSSQSLLYSNGNTYL
HWYLQKPGQSPKLLIYKLSNRFSGVPDRFSGSGSGTDFTLKISRVEAEDLGVYFCS
QSTHVPWTFGGGTKLEIKDGGGSGGGGSGGGGSSQITLKESGPGSSQPSQTLSLTC
SFSGFSLTTYGIGVGWIRQPPGKGLEWLTHIWWNDNKYYNTALRSRLTISKDSSNN
QVLLKIANVDTADTATYYCLYGYTYWGQGTLVTVSADQEPKSSDKTHTSPPSSAP
ELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHNA
KTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKGQ
PREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPVL
DSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

**69. 5B9 VH L11S**

Nucleotide sequence:
gggagctctcaggtgcagctgaagcagtcaggacctggctcagtgcagtcctcacagagcctgtccatcacctgcacagtctctg
gtttctcattaactacctatgctgtacactgggttcgccagtctccaggaaagggtctggagtggctgggagtgatatggagtggtgg
aatcacagactataatgcagctttcatatccagactgagcatcaccaaggacgattccaagagccaagttttctttaaaatgaacagtc

tgcaacctaatgacacagccatttattactgtgccagaaatgggggtgataactacccttattactatgctatggactactggggtcaa
ggaacctcagtcaccgtctcctcag

Amino acid sequence:
(GSS)QVQLKQSGPGSVQSSQSLSITCTVSGFSLTTYAVHWVRQSPGKGLEWLGVI
WSGGITDYNAAFISRLSITKDDSKSQVFFKMNSLQPNDTAIYYCARNGGDNYPYY
YAMDYWGQGTSVTVSS

**73. 5B9 VH L11S scFv**

Nucleotide sequence:
aagcttgccgccatgaggttctctgctcagcttctggggctgcttgtgctctggatccctggatccactgcagatattgtgatgacgca
ggctgcattctccaatccagtcactcttggaacatcagcttccatctcctgcaggtctagtaagagtctcctacatagtaatggcatca
cttatttgtattggtatctgcagaagccaggccagtctcctcagctcctgatttatcagatgtccaaccttgcctcaggagtcccagaca
ggttcagtagcagtgggtcaggaactgatttcacactgagaatcagcagagtggaggctgaggatgtgggtgtttattactgtgctc
aaaatctagaacttccgctcacgttcggtgctgggaccaagctggagctgaaacggggtggcggtggctcgggcggtggtgggt
cgggtggcggcgggagctctcaggtgcagctgaagcagtcaggacctggctcagtgcagtcctcacagagcctgtccatcacct
gcacagtctctggtttctcattaactacctatgctgtacactgggttcgccagtctccaggaaagggtctggagtggctgggagtgat
atggagtggtggaatcacagactataatgcagctttcatatccagactgagcatcaccaaggacgattccaagagccaagttttcttt
aaaatgaacagtctgcaacctaatgacacagccatttattactgtgccagaaatgggggtgataactacccttattactatgctatgga
ctactggggtcaaggaacctcagtcaccgtctcctcag

Amino acid sequence:
MRFSAQLLGLLVLWIPGSTADIVMTQAAFSNPVTLGTSASISCRSSKSLLHSNGITY
LYWYLQKPGQSPQLLIYQMSNLASGVPDRFSSSGSGTDFTLRISRVEAEDVGVYYC
AQNLELPLTFGAGTKLELKRGGGGSGGGGSGGGGSSQVQLKQSGPGSVQSSQSLSI
TCTVSGFSLTTYAVHWVRQSPGKGLEWLGVIWSGGITDYNAAFISRLSITKDDSKS
QVFFKMNSLQPNDTAIYYCARNGGDNYPYYYAMDYWGQGTSVTVSS

**70. 5B9 scFv VHL11S (SSS-S)H WCH2 WCH3**

Nucleotide sequence:
aagcttgccgccatgaggttctctgctcagcttctggggctgcttgtgctctggatccctggatccactgcagatattgtgatgacgca
ggctgcattctccaatccagtcactcttggaacatcagcttccatctcctgcaggtctagtaagagtctcctacatagtaatggcatca
cttatttgtattggtatctgcagaagccaggccagtctcctcagctcctgatttatcagatgtccaaccttgcctcaggagtcccagaca
ggttcagtagcagtgggtcaggaactgatttcacactgagaatcagcagagtggaggctgaggatgtgggtgtttattactgtgctc
aaaatctagaacttccgctcacgttcggtgctgggaccaagctggagctgaaacggggtggcggtggctcgggcggtggtgggt
cgggtggcggcgggagctctcaggtgcagctgaagcagtcaggacctggctcagtgcagtcctcacagagcctgtccatcacct
gcacagtctctggtttctcattaactacctatgctgtacactgggttcgccagtctccaggaaagggtctggagtggctgggagtgat
atggagtggtggaatcacagactataatgcagctttcatatccagactgagcatcaccaaggacgattccaagagccaagttttcttt
aaaatgaacagtctgcaacctaatgacacagccatttattactgtgccagaaatgggggtgataactacccttattactatgctatgga
ctactggggtcaaggaacctcagtcaccgtctcctctgatcaggagcccaaatcttctgacaaaactcacacatccccaccgtcctc
agcacctgaactcctgggtggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggaccccctgagg
tcacatgcgtggtggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgc
caagacaaagccgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctga
atggcaaggagtacaagtgcaaggtctccaacaaagccctcccagccccatcgagaaaaccatctccaaagccaaagggcag
ccccgagaaccacaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaa
ggcttctatccaagcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgct
ggactccgacggctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctcc
gtgatgcatgaggctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctagag

Amino acid sequence:
MRFSAQLLGLLVLWIPGSTADIVMTQAAFSNPVTLGTSASISCRSSKSLLHSNGITY
LYWYLQKPGQSPQLLIYQMSNLASGVPDRFSSSGSGTDFTLRISRVEAEDVGVYYC
AQNLELPLTFGAGTKLELKRGGGGSGGGGSGGGGSSQVQLKQSGPGSVQSSQSLSI
TCTVSGFSLTTYAVHWVRQSPGKGLEWLGVIWSGGITDYNAAFISRLSITKDDSKS
QVFFKMNSLQPNDTAIYYCARNGGDNYPYYYAMDYWGQGTSVTVSSDQEPKSS
DKTHTSPPSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNW
YVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPA
PIEKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQP
ENNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLS
LSPGK

**76. 2H7 scFv VH L11S (SSS-S)H P238SCH2 WCH3**

Nucleotide sequence:
aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtcggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttctgacaaaactcacacatcccccaccgtcctcagcacctgaact
cctgggggggatcgtcagtcttcctcttccccccaaaacccaaggacaccctcatgatctcccggacccctgaggtcacatgcgtgg
tggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagc
cgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggag
tacaagtgcaaggtctccaacaaagccctcccagcccccatcgagaaaacaatctccaaagccaaagggcagccccgagaacc
acaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatccc
agcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacg
gctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgag
gctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSSDK
THTSPPSSAPELLGGSSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLS
PGK

**78. 2H7 scFv VH L11S (SSS-S)H WCH2 WCH3**

Nucleotide sequence:
aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact

ggtaccagcagaagccaggatcctcccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtcggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttctgacaaaactcacacatccccaccgtcctcagcacctgaact
cctgggggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggaccccctgaggtcacatgcgtgg
tggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagc
cgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggag
tacaagtgcaaggtctccaacaaagccctcccagcccccatcgagaaaacaatctccaaagccaaagggcagccccgagaacc
acaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatccc
agcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctcccgtgctggactccgacg
gctccttcttcctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctccgtgatgcatgag
gctctgcacaaccactacacgcagaagagcctctccctgtctccgggtaaatgatctaga

Amino acid sequence:
MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWYFDVWGTGTTVTVSSDQEPKSSDK
THTSPPSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLS
PGK

**79. 2H7 scFv VH L11S (CSS-S)H WCH2 WCH3**

Nucleotide sequence:
aagcttgccgccatggattttcaagtgcagattttcagcttcctgctaatcagtgcttcagtcataattgccagaggacaaattgttctct
cccagtctccagcaatcctgtctgcatctccaggggagaaggtcacaatgacttgcagggccagctcaagtgtaagttacatgcact
ggtaccagcagaagccaggatcctcccccaaaccctggatttatgccccatccaacctggcttctggagtccctgctcgcttcagtg
gcagtgggtctgggacctcttactctctcacaatcagcagagtggaggctgaagatgctgccacttattactgccagcagtggagttt
taacccacccacgttcggtgctgggaccaagctggagctgaaagatggcggtggctcgggcggtggtggatctggaggaggtg
ggagctctcaggcttatctacagcagtctggggctgagtcggtgaggcctggggcctcagtgaagatgtcctgcaaggcttctggc
tacacatttaccagttacaatatgcactgggtaaagcagacacctagacagggcctggaatggattggagctatttatccaggaaat
ggtgatacttcctacaatcagaagttcaagggcaaggccacactgactgtagacaaatcctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtgcaagagtggtgtactatagtaactcttactggtacttcgatgtctggggcac
agggaccacggtcaccgtctcttctgatcaggagcccaaatcttgtgacaaaactcacacatccccaccgtcctcagcacctgaact
cctgggggggaccgtcagtcttcctcttcccccaaaacccaaggacaccctcatgatctcccggaccccctgaggtcacatgcgtgg
tggtggacgtgagccacgaagaccctgaggtcaagttcaactggtacgtggacggcgtggaggtgcataatgccaagacaaagc
cgcgggaggagcagtacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggag
tacaagtgcaaggtctccaacaaagccctcccagcccccatcgagaaaacaatctccaaagccaaagggcagccccgagaacc
acaggtgtacaccctgcccccatcccgggatgagctgaccaagaaccaggtcagcctgacctgcctggtcaaaggcttctatccc
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